

A. Klimczuk, Ł. Tomczyk, *Smart, Age-friendly Cities and Communities: the Emergence of Socio-technological Solutions in the Central and Eastern Europe*, [in:] F. Flórez-Revuelta, A.A. Chaaraoui (eds.), *Active and Assisted Living: Technologies and Applications*, The Institution of Engineering and Technology, London 2016, pp. 335-359. http://digital-library.theiet.org/content/books/10.1049/pbhe006e_ch17

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Chapter 19: Smart, Age-friendly Cities and Communities: the Emergence of Socio-technological Solutions in the Central and Eastern Europe

19.1 Introduction

The primary goal of the chapter is to introduce a background of the development of Ambient Assisted Living (AAL) technologies and applications. The chapter is an attempt to propose an integrated approach to concepts of (1) smart cities and (2) age-friendly cities and communities. Although these ideas are widely promoted by the European Union (EU) and the World Health Organisation (WHO), they are perceived as separate. Meanwhile, these concepts are closely intermingled in theory and practise with regard to the promotion of healthy and active ageing, a universal design, usability and accessibility of age-friendly environments, reducing the digital divide and robotic divide, and reducing social isolation of older adults.

The first two parts of this chapter will outline the concepts, premises, and examples of practical solutions for smart and age-friendly cities and communities (SAFCC). The discussion will include the presentation of the factors shaping the local space, which foster efficiency of older people in the performance of activities of daily living (ADLs). The chapter will provide a brief description of three perspectives on the development of SAFCC. Namely: (1) the needs of older adults, (2) supporting factors and barriers to the implementation of AAL solutions in local ageing policies, and (3) examples of technological solutions, in particular, associated with the modernization of public spaces and solutions related to the concept of “ageing in place 2.0.”

The further parts of this chapter will describe the needs of the older adults that influence the design and implementation of SAFCC in the Central and Eastern Europe (CEE). We focus on countries of this region not only due to the rapid ageing of populations but also infrastructure deficiencies and institutional barriers that clearly shows the need to integrate concepts of smart cities and age-friendly cities and communities. To this end, the brief description of indicators of SAFCC and differences between selected cities will be presented.

The proposed analysis will include both “soft factors” (aimed at activation of older citizens and the development of cultural and educational activities) and “hard factors” (physical accessibility, infrastructure, and technological solutions). This review will be possible by the description of theoretical assumptions affecting the need to create local ageing policies in relation to the cities and communities of the fastest ageing populations in the EU.

With reference to the model of age-friendly cities and communities [79] and an eclectic and multidimensional definition of smart cities [31], we will briefly analyse examples of technological solutions related to the AAL such as gerontechnologies and social innovations in eight fields: outdoor spaces and buildings; transportation; housing; social participation; respect and social inclusion; civic participation and employment; communication and information; and community support and health services.

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The conclusion will underline the need for participatory formulation of AAL technologies and applications with older adults and the need for advocacy to promote the AAL in association with the concept of the “silver economy.”

19.2 The Smart Cities and Communities in the Context of the Population Ageing: An Overview of the Concept

At the beginning of the 21st century, the discourse on the revitalization of urban spaces is particularly important. Local administration, especially in urban areas, must meet the growing expectations of different groups of people (stakeholders) both as citizens and, among others, consumers, workers, entrepreneurs, investors, and members of families and communities. Furthermore, in the context of demographic change, urban renewal must include, among others, issues such as the population ageing, increasing the life expectancy, increasing pressure on the needs of people with disabilities regarding the elimination of architectural barriers and accessibility of public infrastructure, depopulation of some districts as well as unfavourable changes in birth rates, fertility, and mortality.

According to the United Nations (UN), particularly noticeable is the process of “double ageing” of the population that is the rapid increase of old-old (75-84 years) and oldest-old (over 85 years) age groups in the population. The population of people over 80 years old is expected to grow worldwide from 120 million in 2013 to 392 million in 2050 [73]. In urban areas, these changes will be reflected primarily in the increased demand for care services, health services, and social services [17, 53, 54]. However, it should be noted that the population ageing not only significantly reduces the potential for the informal care provided mainly by families. This process also leads to the emergence of the “sandwich generation,” that is defined mostly as people in middle age (40-59 years), who must reconcile their caring responsibilities towards their children and parents with maintaining a professional activity [1, 50].

The population ageing entails many consequences (social, economic, political, and cultural), but it is also a challenge to create new solutions so that societies can function better in the future. Attention, in particular, should be paid to older generations because the rate of population growth in the retirement age in CEE according to demographic projections will vigorously increase [85]. Poland, the Czech Republic, Hungary, and Slovakia (the countries of the Visegrad Group) in particular in recent years started to feel the effects of demographic changes through phenomena such as depopulation of large cities. This process is occurring mainly in centres, which concentrated industry during the period of real socialism, e.g., in Poland in the years 1995-2013 only six cities were characterised by an increase of population: Kraków, Olsztyn, Rzeszów, Warsaw, Zielona Góra, and Białystok [65]. However, the progressive urbanisation in CEE enforces implementation of new socio-technical solutions in the local urban systems together with the full transfer of the idea of active ageing in various areas of life. The active ageing allows people to realise their potential and to participate in social life [77]. This approach points to the need for a multidimensional approach to support older adults. An age-friendly environment consisting of a relevant resource for educational and learning institutions is one of the factors that allow the activation of older people [cf. 48].

The discussed demographic changes force the search for innovative solutions to employment, health, life-work balance, participation in culture, recreation and sport as well as the delivery of public services to facilitate the implementation of various tasks and goals of stakeholders (e.g., transport, telecommunications, social housing, and environmental protection). Thus, the population ageing is an important stimulus for the creation of

technological innovation and social innovation. Such innovations include product solutions and services defined at the beginning of the 21st century as “calm technologies” that do not require user’s attention; “ambient technologies” that are embedded in user’s environment; and “smart technologies” that facilitate the provision of complex solutions to the user in the simplest way possible [8, 76]. The term “smart” is used in particular in relation to devices and processes that are using the latest technology in such a way that, despite its inherent complexity may be intuitively used by users, thus may respond to human needs in an efficient and activating way.

The main goals of the Strategy “Europe 2020” [22] that were adopted by the EU in 2010 are striving for the development of smart, sustainable, and inclusive growth. The European Commission’s report, “The Growing Silver Economy in Europe” [23] points out that 110 European regions consider healthy and active ageing as their priority of smart specialisation in the coming years. This means that these regions intend to focus on support supplied to industries of the “silver economy,” that is a system of production and distribution of goods and services aimed at ageing populations [41]. These sectors include, among others, cosmetics and fashion, silver tourism, service robotics (including AAL solutions), the health and wellness sector (including medical equipment, pharmaceuticals, and telemedicine), functional food, security, culture and lifelong learning, entertainment, smart and autonomous transport (e.g., self-steering cars), assistive technologies, and banking and financial services dedicated to older adults.

In the context of the silver economy and smart growth, the concept of smart cities may be understood in particular as urban areas that widely utilise information and communication technologies (ICTs) to organise and provide all urban functions, e.g., to reduce costs of infrastructure maintenance (e.g., roads, bridges, subways, airports, seaports, public transport, and sewerage), consumption of resources (e.g., gas, electricity, and water supply), better use the free spaces as well as to engage citizens in local governance [5]. Terms similar to the smart city are a cyber city, cyberville, digital city, electronic communities, electronic spaces, flexicity, information city, knowledge-based city, teletopia, telicity, intelligent city, virtual city, and wired city [14, 43]. At this point, we need only to mention that in 2012, the European Innovation Partnership for Smart Cities and Communities [24, 67] was launched to connect cities, industry, SMEs, finance sector, research and other stakeholders in activities related to, among others, sharing knowledge, create international partnerships as well as develop and implement smart city solutions.

A special position in the concept of smart cities can be given to (1) smart homes and technologies compatible with the paradigms of (2) AAL and (3) ageing in place 2.0, which aim to facilitate activity during ageing mainly with electronic aids for ADLs. The concept of smart homes includes solutions such as mobile applications and Web-based control, monitoring, and automation functions of housing, such as lighting, heating, ventilation, alarm system, video surveillance, fire alarm system, emergency power supply, and management system for production and storage of renewable energy [54, 60]. While the concept of the AAL refers to the wider application of technology in living environments to extend the sole use of them by older adults as well as increasing their autonomy and certainty, reducing risky and monotonous actions, monitoring health and providing health care, increasing the sense of security, and saving resources [62]. The last-mentioned concept – ageing in place 2.0 – focuses on the empowering older citizens by systems of integrated services that need two categories of infrastructure investment (1) connections to the world outside the home (e.g., transportation and community infrastructure and (2) home design, devices, and assistive technologies that will reduce risk and facilitate wise and effective use of resources [49].

Examples of AAL and ageing in place 2.0 include intelligent living spaces, detecting and mitigating problems of older adults, such as memory loss, wandering, and health issues; smart products such as floors equipped with sensors and shoes with actuators to detect or prevent them falling, pendants for starting the alarms of social assistance or equipment to remind about the time to take medicines; and digital information services, including, among others, the sphere of security, monitoring of health (e-health), and remote care (telecare).

The idea of smart cities as a response to the new needs of residents and civilizational challenges (e.g., population ageing, mobility, and environmental protection) includes all concepts mentioned above. The idea of the city “smarter” than in the past assumes the most optimal use of the potential of the various capitals of the city and citizens as well as the integration of resources through the creation of new solutions and implementation of best practises for improving the quality of life [6]. Local administration or non-governmental organisations (NGOs) and community leaders activate these processes. The smart city can be defined by services, such as:

- Smart power grids to enable end users to reduce the amount of used energy power.
- Traffic control to reduce traffic jams and, therefore, the increased liquidity of traffic and environmental protection.
- Supervision of pedestrian traffic to raise the level of security,
- Remote monitoring of patients’ health, among others, by telecare that will optimise the involvement of medical personnel and prompt assistance.
- Vehicle telematics systems associated with the technical and information infrastructure for the use of galvanic cell powered cars.
- Registry to monitor the activity of urban municipal services including public transport system [6].

One of the visions of smart cities assumes that such type of the agglomeration allows greater operational efficiency due to the use of similar instruments and algorithms, which are designed to increase the competitiveness of enterprises [31]. However, despite the increasing wealth of technical solutions aimed at improving the quality of life, an idea of the smart city cannot be implemented without reference to the needs of residents. Efficient organisation of urban space requires an approach that highlights the human agency of residents, because the use of “technocentric approach” creates a sense of dehumanisation and loss of the sense of autonomy, and thus inhibits even the most innovative solutions [cf. 6]. In the concept of smart cities, the need becomes a starting point for creating solutions that create new, intelligent solutions for creating sustainable spaces.

Another, the supplementary approach assumes that smart cities should be based on the human capital and social capital of inhabitants [12]. In a situation where the state, local governments or private companies are not able to innovatively respond to the needs of individual residents, their potential is activated independently through bottom-up initiatives. Examples include time banks, local currencies, barter initiatives, neighbourhood care circles, cohousing, car sharing, and all kinds of social enterprises [41]. This approach to the smart cities is also related to the notion of “creative class” that is category of knowledge workers, intellectuals, artists, and other free professions that play major role in restructuring cities and regions in relation to the needs of cultural and creative industries (e.g., science, engineering, research, arts, design, and media) [28]. Thus, the SAFCC are already described as spaces that foster the “creative ageing,” that is, engaging older adults in creative activity, which aims to shift from highlighting their problems to underline their potential [9, 41].

The smart cities also focus on the integration of data about the activities of communities and big data analysis that allows the creation of “tailored solutions” on the local level. Municipal institutions collect huge amounts of data in digital form, which, by their respective linking and processing are an enormous source of information for those responsible for creating urban spaces. Increasing and improving the quality of databases is possible thanks to the wider use of the concept of the “Internet of things,” which is expanding the network through the devices and equipment (e.g., home electronics, machines, and sensors) that can communicate with people and with each other, e.g., during the provision of energy services, reducing traffic congestion, reducing the consumption of street lighting, monitoring pollution and noise, supporting the urban horticulture, and waste management [56, 84]. The smart home system, e.g., can remember an about watering lawns and turning off the iron. It can also memorise the behaviour of the household and during holiday simulate their presence by turning on and off lights and shading windows. The system can also at the right time open the service door for the cleaners. Smart electricity meter can work with household appliances for efficient energy management. Selected devices such as washing machines or dishwashers can be switched off at the energy summit and turned beyond. Therefore, the smart cities appear not only in the prism of new solutions based on increasing and improving the service offer by the public institutions but also as the better use of existing data.

Given the difficulties of unifying the concept of smart cities, scholars from Vienna University of Technology for measuring the scale and characteristics of this phenomenon offered an eclectic and multidimensional definition [31]. Thus, the smart city can be defined through the development of the six fields.

- The first field is a “smart economy,” which is understood as competitiveness. This field is measured by indicators that describe innovation climate, entrepreneurship, the image of the local economy, productivity, labour market flexibility, embeddedness of the city in networks of international cooperation, and the ability to transform the city continuously.
- The second field is called as “smart people” that are the human and social capital of the city residents. To measure these field indicators such as the level of education, the tendency for lifelong learning, social and ethnic diversity, flexibility, creativity, cosmopolitanism, openness, and participation in public life are used.
- The third dimension is the “smart governance,” which is widely understood as social participation. Indicators of this field are the participation of citizens in decision-making bodies, the scope of public and social services, transparency of governance, public policies, and political perspectives.
- The fourth field is “smart mobility” related both to the transport and to the use of ICTs. The indicators are the availability of local, national and international accessibility of the city, the presence of ICT infrastructure, sustainable, innovative, and secure transport systems.
- The fifth field is a “smart environment” that is an approach to natural resources. Indicators of this dimension are the attractiveness of natural conditions, the level of the pollution, environmental protection, and sustainable management of resources.
- The last field is “smart living” that is defined as a quality of life. This area includes factors that affect the lives of the inhabitants of the city, such as the availability of cultural and educational institutions, health conditions, personal safety, quality of housing, tourist attractiveness, and social cohesion.

In conclusion, the discussed definition of smart city emphasises not only the close links between cities and new technologies, but also the pursuit of the sustainable development by emphasising the importance of simultaneous support for the economic growth, social development, and the environment protection.

19.3 The Smart and Age-friendly Cities and Communities from the Perspective of the Oldest Residents

The concept of age-friendly cities and communities is about the creation of conditions for activities to promote healthy and active ageing [cf. 63]. This idea assumes allowing people of all ages and, in particular, older people to continue working, social and political engagement, and the implementation of their plans. Such cities and communities should provide both a sense of security, and adapt their infrastructure, resources, development goals, and operational programmes to the needs and opportunities of an ageing population.

The age-friendly city and community [79] through the extensive inclusion and support of activities of various groups of stakeholders in public policies picks also aim to change the perception of older adults and ageing, in particular by younger generations [75]. The concept of age-friendly cities and communities aims to improve the quality of life, not only among the representatives of the older generation but also among other social groups that have a large resource of free time and specific physical conditions. In other words, it is a space that by the adoption of the principles of universal design [29] is to be friendly to everyone regardless of age, in particular for groups such as children and young people, their parents, mothers with prams, people with disabilities.

The age-friendly cities and communities: take into account the diversity among the seniors (inhomogeneity due to, e.g., health, education, income, and model of the family); creates optimal conditions for active people and allows the smooth functioning of those less mobile; supports equal rights through the development of various capitals of older adults; ease of restrictions arising from the biological course of ageing; integrates all age groups and strengthens intergenerational dialogue and solidarity; and fosters a sense of community [cf. 75].

In the last years in the literature, the concept of age-friendly cities and communities was developed by various authors [33, 52, 57]. However, at this point we want to underline the WHO's framework that focus on global, standardised and a bottom-up participatory approach. The WHO [79] has developed a set of indicators and the checklist of essential features favouring the practical implementation of the idea of the age-friendly cities and communities. This was possible due to the programme for the development of standards to adapt cities to the needs of older adults that was launched in 2005. The indicators of age-friendly cities and communities were divided into solutions that promote the active ageing in eight dimensions:

- (1) Outdoor spaces and buildings (e.g., cycle paths have to be separated from pavements; buildings are well signed outside and inside with, among others, accessible elevators, and non-slip floors).
- (2) Transportation (e.g., driver education and refresher courses are promoted; priority parking and drop-off spots for people with special needs are available and respected).
- (3) Housing (e.g., sufficient and affordable housing for frail and physically challenged older people).

- (4) Social participation (e.g., activities and events can be attended alone or with a companion; good information about activities and events is provided, including details about the accessibility of facilities and transportation options for older people).
- (5) Respect and social inclusion (e.g., older people are visible in the media, and are depicted positively and without stereotyping).
- (6) Civic participation and employment (e.g., workplaces are adapted to meet the needs of physically challenged people; training in post-retirement options is provided for older workers).
- (7) Communication and information (e.g., public and commercial services provide friendly, person-to-person service on request; electronic equipment has large buttons and big lettering).
- (8) Community and health services (e.g., emergency planning takes into account the vulnerabilities and capacities of older people; health and social services are conveniently located and accessible by all means of transport).

The list of indicators may be divided into three categories. The first three areas are related to the physical environment of older adults and their mobility. The next three fields create the social environment of older adults. The last two areas are related to socioeconomic factors of quality of life of older adults and focused on possibilities of receiving adequate support.

The list of indicators is not closed and is not intended to compare which city and community are more age-friendly, but it makes possible to make a detailed self-assessment and identify deficiencies that require intervention and corrective action. The list also allows policy makers to determine what factors interfere with residents in a given, specific city, and the environment [75]. The guidelines and the list do not show, however, how to tackle identified problems and do not show any effects of introduced programmes [cf. 2, 47].

The WHO in 2010 established the initiative of the Global Network of Age-friendly Cities and Communities. Centres that are candidates for membership in the network are committed to the development and implementation of reform programmes in the dimensions mentioned above. Programmes are evaluated and supported by the WHO, and the main criterion is the involvement of older people in all stages of action - not just, e.g., as members of the boards to generate some opinions, but also as animators of projects and those who are monitoring their progress, participate in the evaluation, and improve future operations. In 2011, Dublin in Ireland and in 2013 Quebec City in Canada hosted international conferences on age-friendly cities and communities to collect as much as possible a diverse range of stakeholders of this social movement and to identify common problems in the implementation of the concept and strategies to break down the barriers of their development [78].

In 2015, the WHO also proposed guidelines for measuring the age-friendliness of cities [80]. The framework further divides indicators related to previously described eight dimensions into five categories. The first category includes indicators of inputs that are resources and structures used during public interventions. The second category refers to outputs, which are the effects of interventions regarding age-friendly environments such as planning and land use, the design of public spaces, housing, and transportation design. The third category includes indicators of outcomes that are short-term changes generated by interventions such as accessibility of public spaces, affordability of housing, and participation in decision making. The fourth category refers to indicators of impact that are long-term changes such as increased health and wellbeing. The last set of indicators refers to equity and is crosscutting the framework as a principle of interventions and may be measured by comparing differences between two reference groups in terms of gender, age, wealth, and

neighbourhood. This framework may be used to monitor and evaluate interventions, compare achievements of various cities and communities, and to collect best practises.

At this point, we may compare the features of age-friendly cities and communities to the elements of a smart city (Table 19.1). However, the introduction of the more integrated theory of SAFCC is still the challenge that needs more research and discussion.

TABLE 19.1 ABOUT HERE

Age-Friendly City	Smart City
- Outdoor spaces and buildings	- Smart environment
- Transportation	- Smart economy - Smart mobility
- Housing	- Smart economy - Smart living
- Social participation	- Smart people - Smart governance
- Respect and social inclusion	- Smart people - Smart governance - Smart living
- Civic participation and employment	- Smart people - Smart economy
- Communication and information	- Smart economy - Smart mobility
- Community and health services	- Smart governance - Smart living

Table 19.1: Dimensions of a Smart and Age-Friendly City
Source: Own elaboration based on [31, 79].

Researchers from Intel Corporation [46] tried to combine the concepts of the smart city and the age-friendly city in the context of demographic challenges and urbanisation in China. They combined the use of ICTs with changes of the model of care for older adults towards support them in the local community, neighbourhoods, and ageing in place. Thus, their idea aims to allow reducing the cost of social and health care by decreasing the growing demand for nursing homes and long-term care facilities.

Intel’s researchers as the current challenges in achieving the full benefits of the implementation of the smart and age-friendly cities recognise: the demand for services, which is so high that it brings a negative impact on their quality; insufficient level of an integrated evaluation system of care services; systems that are not integrated enough to respond to individual needs; and infrastructure that is outdated in many places, which restricts the use of the potential of mobile technology [46]. Moreover, the researchers note that the implementation of the idea of smart and age-friendly cities will allow societies to achieve benefits such as the improvement of communication and active ageing in local communities, the increase in personal safety, the autonomy and independence of older adults, and the facilitation of their further activity and productivity also in the labour market. Intel’s analysts also point out that in smart cities it is crucial to highlight the recognition of their multisectoral character for the quality of service provision for older people. A key role in the organisation of services may be given to local authorities that can also provide services, which limits their

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quality. Alternatively, the government may delegate tasks of providing services to private entities or NGOs. In another perspective, the services of the smart city for older adults may be developed by market logic, in which access to services may be restricted to the poorer groups, and the quality of services will be very diverse if there will be no industry self-regulation mechanisms.

Also, the creators of smart care services should take into account some stakeholders who, in varying degrees, can participate in the information flow and anticipation and meeting the needs of seniors [46]. The information system should connect not only the devices but also diverse stakeholders relevant to older adults as recipients of services. The stakeholders considered here are: platform manager, suppliers of the individual services (e.g., volunteers and nurses), services partners, payers (e.g., local government), a family of older adult, a provider of ICTs, health care system, and rescue organisations (e.g., ambulance, gas, power, and heating maintainers and providers).

Intel's researchers recommend the use of the three stages of building a platform for smart and age-friendly city and community: (1) to meet the basic requirements, e.g., creating services, to ensure their compliance with the standards, and integration; (2) open development consisting of further social sharing of access to the platform, increasing the impact, and generating added value; and (3) making decisions through the use of knowledge of the local government, service providers, and seniors.

However, it should be noted that the disadvantage of a concept proposed by Intel Corporation is that it focuses on care and health services and to some degree on housing [cf. 60]. This concept, however, is certainly a good starting point for constructing systems that will also include other fields of SAFCC.

19.4 Shaping of Smart and Age-friendly Cities and Communities on the Example of Central and Eastern Europe

In this section on the basis of the typology of age-friendly characteristics proposed by the WHO and review of definitions of a smart city, we will discuss examples of solutions from CEE countries that focus on the development of SAFCC. So far usually in the literature are discussed examples from Western Europe, North America, and Asia-Pacific region such as Amsterdam, Barcelona, Copenhagen, Helsinki, Singapore, Songdo, Vancouver, and Vienna. Moreover, these cities have been usually described only in separated terms of smart cities or age-friendly cities [2, 10, 13, 14, 15, 18, 21, 27, 30, 32, 53, 59, 60, 66, 68, 71, 72, 74].

The approach presented in this chapter tries to take a closer look at the cities and communities in countries that are not only characterised by rapidly ageing populations and mainly medium-size cities but also shortcomings of the infrastructure that makes the development and implementation of AAL and ageing in place 2.0 solutions even more challenging and significant [7, 16, 36].

19.4.1 The Smart and Age-friendly Cities and Communities in Connection with the Active Ageing Index and European Welfare Systems

Scholars from Vienna University of Technology [25, 31] conducted three editions of ranking of medium-sized smart cities in the EU in 2007, 2013, and 2014. The third edition of the ranking compares 77 medium-sized cities with a population between 100,000 and 500,000 inhabitants. Top 10 positions in the total ranking that summarises all six dimensions of the smart city are: (1) Luxembourg, Luxembourg, (2) Aarhus, Denmark, (3) Umeå, Sweden, (4)

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Eskilstuna, Sweden, (5) Aalborg, Denmark, (6) Jönköping, Sweden, (7) Odense, Denmark, (8) Jyväskylä, Finland, (9) Tampere, Finland, and (10) Salzburg, Austria. Thus, all best practises of medium-sized smart cities are outside CEE countries.

Interesting findings may be generated by the comparison of the ranking of medium-sized smart cities (SCR) with the active ageing index (AAI). The AAI includes comparisons between the 28 EU Member States, including indicators divided into two dimensions and four domains and further subdivided by gender: actual experiences of active ageing (employment; participation in society; independent, healthy, and secure living); and capacity and enabling environment for active ageing [83]. Moreover, a positive correlation of the AAI with GDP per capita was noted, which suggests that the countries with relatively higher standards-of-living are generating better capacity and enabling environment for active ageing [83].

To understand the differences in the development of SAFCC, we may divide the results of the SCR and AAI according to the typologies of welfare states. A well-known concept of different welfare regimes was proposed by Gøsta Esping-Andersen [20] and includes the decommodification index and impact of benefits and social services on social stratification. This theory explains that in countries with a social-democratic regime there is a high degree of decommodification, universal care and nursing services provided by public entities, high wage replacement by social benefits, full employment policy, and the strong position of labour unions, e.g., the Nordic countries. In a conservative corporatist regime, the state supports the family, social security depends on the position of individuals in the labour market, social care insurance and nursing care services primarily delivered by informal carers, NGOs, and local communities, e.g., Austria, France, Germany, and Italy. The last group of countries represents a liberal regime, which is characterised by individualism in the field of social security, low decommodification and social benefits, benefits based on income, widespread commercialisation of care and nursing services, competition between different suppliers, and a small role of labour unions, e.g., the United Kingdom and the United States. Yuri Kazepov [38] expanded Esping-Andersen typology by two types of welfare states. The first, the familistic system, focuses on fewer resources that are targeted to family policies and overload of the family in social caring responsibilities, the gender segmentation in the labour market, local differentiation of particularistic interests and different forms of governance, and weak prevention of poverty, e.g., Spain and Italy. The second, welfare system in transition countries, refers to an emerging model in the CEE countries. The reforms are taken here in the context of financial constraints and with ambivalent consequences. Some countries focus on privatisation while other invests in the coordinated market and social policies. In addition, there were significant reforms of the territorial organisation oriented to move away from central regulation towards more decentralised levels.

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Welfare Systems	Employment				Participation in Society				Independent, Healthy and Secure Living				Capacity and Enabling Environment for Active Ageing				Overall			
	Index		Rank		Index		Rank		Index		Rank		Index		Rank		Index		Rank	
	2012	2014	2012	2014	2012	2014	2012	2014	2012	2014	2012	2014	2012	2014	2012	2014	2012	2014	2012	2014
Liberal (United Kingdom)	35.5	35.8	3	4	20.0	20.0	11	11	75.7	73.7	6	11	61.4	61.3	5	5	39.3	39.2	4	5
Social-Democratic (Sweden)	41.0	43.4	1	1	22.6	22.6	4	4	78.7	78.6	2	4	69.5	69.2	1	1	44.0	44.8	1	1
Corporative (France)	21.0	24.1	21	16	22.4	22.4	5	5	74.6	75.9	9	6	57.8	59.1	9	9	34.2	35.7	12	9
Familistic (Italy)	20.9	23.0	22	19	24.1	24.1	2	2	69.9	69.0	19	17	52.8	53.4	15	15	33.3	34.0	15	14
In Transition (Poland)	19.8	22.4	24	20	12.2	12.2	27	28	67.5	64.9	21	24	46.7	47.9	22	22	27.3	28.2	27	27
EU27 / EU28	27.1	27.9	-	-	18.1	18.1	-	-	71.7	70.6	-	-	54.2	54.4	-	-	33.8	34.0	-	-

Table 19.2: The Active Ageing Index (AAI) and European Welfare Systems in Comparative Perspective
Source: Own elaboration based on [38, 82, 83].

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Welfare Systems	City	Domains of Medium-sized Smart Cities Ranking (SCR)							Average Country Rank in the SCR	Country Rank in the AAI
		Smart Economy	Smart People	Smart Governance	Smart Mobility	Smart Environment	Smart Living	Total		
Social-Democratic (Sweden)	Umeå	24	5	2	34	1	13	3	4	1
Social-Democratic (Sweden)	Eskilstuna	21	1	7	24	3	41	4	4	1
Social-Democratic (Sweden)	Jönköping	32	13	3	11	2	26	6	4	1
Corporative (France)	Montpellier	29	20	16	46	4	30	19	25	9
Corporative (France)	Nancy	44	37	13	23	11	20	23	25	9
Corporative (France)	Poitiers	47	38	10	44	8	15	25	25	9
Corporative (France)	Clermont-Ferrand	38	40	18	36	10	17	26	25	9
Liberal (United Kingdom)	Cardiff	12	32	44	19	58	16	31	37	5
Liberal (United Kingdom)	Aberdeen	8	25	52	42	43	32	34	37	5
Corporative (France)	Dijon	52	41	21	41	7	22	35	25	9
Liberal (United Kingdom)	Portsmouth	9	30	42	13	65	53	36	37	5
Liberal (United Kingdom)	Leicester	7	35	46	5	67	63	39	37	5
Liberal (United Kingdom)	Stoke-On-Trent	31	42	47	26	55	60	45	37	5
Familistic (Italy)	Venezia	33	63	68	32	59	8	46	54	14
Familistic (Italy)	Verona	25	57	61	45	66	28	49	54	14
Familistic (Italy)	Trento	43	48	74	62	30	39	52	54	14
Familistic (Italy)	Trieste	37	58	66	66	31	47	53	54	14
In Transition (Poland)	Rzeszów	63	64	49	56	56	50	55	62	27
In Transition (Poland)	Szczecin	64	62	50	55	47	65	56	62	27
Familistic (Italy)	Perugia	57	54	65	68	53	42	57	54	14
Familistic (Italy)	Padova	34	44	75	60	73	45	61	54	14
In Transition (Poland)	Bydgoszcz	60	68	54	50	64	64	62	62	27
Familistic (Italy)	Ancona	54	66	72	67	29	62	65	54	14
In Transition (Poland)	Białystok	68	67	45	61	72	61	66	62	27
In Transition (Poland)	Kielce	71	65	51	65	68	58	68	62	27
In Transition (Poland)	Suwałki	67	70	55	57	71	68	70	62	27

Table 19.3: The Active Ageing Index (AAI), European Welfare Systems, and Domains of Medium-sized Smart Cities Ranking (SCR) in 2014

Source: Own elaboration based on [25, 38, 83].

TABLE 19.2 ABOUT HERE

TABLE 19.3 ABOUT HERE

The comparison of selected countries that represent various welfare systems and the AAI (Table 19.2) shows that social-democratic and liberal regimes had relatively better cope with the population ageing than corporative regimes, familistic regimes, and regimes in transition. The red colour used in the table suggests the highest ranks in comparison to other countries and regions as well as awareness of the challenges of the population ageing. In contrast, the green colour shows the lowest positions in the ranks. The further comparison of the SCR and AAI confirms that medium-sized smart cities in the social-democratic and liberal regimes may offer a higher quality of life for older adults (Table 19.3). These differences might be important to study the variety of models of the silver economy, AAL solutions, and specific fields of the SAFCC.

19.4.2 Outdoor Spaces, Buildings, and Housing

The first example of creating a smart and age-friendly urban environment in CEE countries and at the same time welcoming public space, not only for seniors but also for other age groups is the development of spaces that allow popularisation of physical activity, e.g., tennis, health paths, and bike trails. In an increasing number of Polish cities can be seen specialised devices for developing physical activity among older people. Most of the Polish Universities of the Third Age (UTA) have sports sections [48] that benefit from newly created urban resources available in the public parks, along rivers or near the market, senior clubs, UTA, and various cultural facilities. Part of the sports facilities developed in Poland is created mainly through social participation programmes, among others, under local civic budgets.

Many interesting examples of building dedicated to seniors and of the smart economy and smart living can be found in the property development market in CEE countries. The property development and organisations specialised in care for older adults to perceive the market potential inherent in older age groups of society [39]. Adaptation of buildings and housing to meet the needs of older adults are primarily the removal of existing obstacles to overcome, such as architectural barriers, lack of elevators, narrow corridors, and entrances that make difficult moving for people with disabilities.

A valuable solution that is fully compatible with the idea of a smart and age-friendly city is in a building designed by the Jewish community in Prague, Czech Republic (district of Vinohrady) [19]. Near the old town hall from 1911, in 2008 was built, the modern complex with more than 100 places for older people of Jewish origin. The building is inhabited not only by persons who need professional rehabilitation but also the active seniors. The building received international awards for its functionality, original architecture, and innovative solutions. The new building is integrated with the old town hall and creates a bridge between history and modernity. In the old building, there is a “hospoda” (place for feasts) and kindergarten (also for non-members of the Jewish community). This type of construction proves that the facility for older people does not necessarily need to resemble the traditional caring houses, but may also arouse admiration regarding architecture and promote intergenerational solidarity.

In comparison, a different solution that may be disseminated in CEE countries was developed in Burlington, Canada [11]. The HomeShare initiative is a model of cohousing that

assumes cooperation between two people representing various households who reside together. Apartments and homes are divided between older adults into private space and common areas including the living room and kitchen. This model allows people to exchange services, share responsibilities, offer companionship, reduce isolation, and limit accommodation expenses.

At this point, it is worth noting some other smart solutions implemented, in particular in Poland after 2014. In cities of Bydgoszcz, Rzeszów, and Poznań are ongoing projects for the creation of smart transport systems. Poznań, Ostrołęka, and Warsaw are creating smart heating networks. Bydgoszcz, Szczecin, and Kraków are creating remote lighting management systems [58]. However, Gdańsk is considered the most advanced example of “smart city” in Poland due to early implementation of many innovative solutions during the project “ACCUS” [58]. This project helped to create, among others, smart traffic control, urban lighting, and automatic identification of vehicles aimed at raising road safety.

Mentioned examples may be further developed as in Brabant, Netherlands [17]. This city is crucial in the implementation of a regional innovation strategy that aims to foster the creation of new types of infrastructure and technologies for older adults in relation to the concept of active and healthy ageing. In other words, cities in CEE countries may use smart infrastructure investments for the development of local clusters and ecosystems of providing services, and regional models of the silver economy. For comparison in Hong Kong NGOs created partnership with gerontology research institutes and local government to establish research project that will establish intergenerational programmes and institutions in various fields described in the WHO’s framework of age-friendly cities [34]

19.4.3 Social Participation, Civic Participation, and Employment

According to the WHO, one of the elements of age-friendly cities is the social participation of their citizens. This feature also provides the potential of smart people and smart living in a given space. There are two examples of these ideas in Polish cities. The first is related to selecting projects under separate municipal budgets dedicated to NGOs. Among them, there are also institutions performing tasks for older adults. Votes for civil society projects usually take place once a year in the traditional way (e.g., in the municipal office) or via the Internet.

Another model of cooperation between local governments with seniors involves the establishment of “senior councils,” which are designed to act as consultants and advisory bodies. Councils are an attempt to activate older people through the involvement in co-decision and governance regarding the implementation of tasks of local government units. In Poland so far operated only youth councils, but without any legitimacy. At the end of 2013 under the amendment to the Local Government Law, the concept of senior councils was added. This situation not only allows the co-decision of older adults in the governance of the cities, municipalities or villages but also supports the promotion of values such as intergenerational solidarity and strengthening of the civic participation. Until 2014, at least 76 senior councils were launched in Poland [61]. Most of these entities have a common range of activities. The senior council in Oświęcim, Poland, e.g., has been operating since 2012, and its tasks include [45]:

- Monitoring needs of seniors and initiating projects aimed at social inclusion of older citizens and fully meet the needs of this social group.
- Take measures to use the potential of older people and their time for public initiatives, in particular in the fields of culture, sport, and education.

- The consultation of legal solutions concerning the situation of older adults or likely to affect it and matters submitted to the council by the city's mayor.
- Advice on the issues of older people, particularly in the field of social security, health care, social support, and care services.
- Informing the inhabitants of the city about specific directions of activities undertaken by the municipal services and NGOs regarding older citizens.
- The cooperation with organisations and institutions that deal with the problems of older adults.
- The participation of representatives of the senior council in sessions of the city council.
- Submitting annual reports on the activities of the council to the mayor.

Thus, senior councils with legitimacy can create space for civic-administrative communication that allows efficient creation of innovative solutions and services for the ageing population. Undoubtedly, this type of new civic formation is not able to represent the interests of all seniors but provides an opportunity to perceive better the needs of older adults by officials responsible for managing the city.

Civil engagement of older adults may be stimulated in a less direct way [81]. *Cité Seniors* in Geneva, Switzerland, is an example of the information and meeting centre. The facility provides space, events, workshops, and training courses to exchange ideas and learn including computer skills and creative arts. The facility is related to a platform of NGOs run by older adults that include more than 35,000 members.

Social participation in SAFCC can also manifest itself in various ways. An example might be a solution in which the Hungarian NGOs engage in cooperation with the city regarding the care services for older adults. The NGO called as the Maltese Assistance Centre with the financial support of Gyôr City specialises in helping older people who are deprived of care and support. Volunteers and a dedicated team under the agreement with the city provide assist in the homes of older citizens and special facilities. These activities are carried out through long-term cooperation with the city authorities [64].

The described examples may be also compared to solutions developed in Manchester and Newcastle in the United Kingdom [17]. In these cities have been created strategies that take into account citizen involvement in decision-making. These documents also foster the development of centres of excellence in research on ageing that have been established at local universities. Another example is Livorno, Italy, where the emphasis was put on promoting the activity of older workers through training and apprenticeships, mid-life career advice, and job guarantees [17]. More focus on the productive ageing was also put in Toyama, Japan [17]. The city has developed a network of Silver Human Resources Centres that are offering job placement services and temporary jobs to maintain the employment of older workers in the agricultural industry and maintain population density.

19.4.4 Transportation

Support of activities for older people is also related to public transport. The SAFCC in this field are characterised by not only the introduction of free communication for seniors but also a specific model of providing information about the available transport connections. Friendly signboards with clear fonts, information on delays and the transparency of the graphic on the carrier's website facilitate the movement of older adults in urban space.

During the implementation of activities in the field of mobility should be defined stages or events in life that cause or may cause a change. In the case of older adults, this can be retirement; will to be a grandfather or grandmother; moving to a smaller and/or better-adapted housing; illness or accident; death of a spouse; loss of licence; or the relationship of older adults with their grandchildren [26]. For older adults facilitation of movement in public space are not high curbs, even surface roads and sidewalks, safe and equipped with regulation of light and sound to pass through the road, densely spaced benches enable short rest, good and understandable signage, public transport equipped with benches and roofed shelters, as well as the presence of public toilets [4].

The “Active Senior’s Card” [37] launched in Białystok (Poland) entitles older adults with discounts for public cultural, sport and recreation institutions, and in private companies that have joined the programme. This card is also integrated with public transport card so that the surcharge can act as authorising a special ticket for multiple trips with all bus lines in the city.

Another solution that supports the development of smart mobility of older people is urban taxis dedicated to seniors. Pioneers in this field are Czech cities such as Cesky Krumlov, Plzeň, and Bohumin [55]. The condition of using the service is a check in the city and pays a small fee (Plzeň - 30kc is about 1.2 Euro for the whole taxi ride within the city). Seniors may move dedicated taxis in the city from 6:00 to 22:00. Ordering a taxi is possible at the earliest three weeks before the planned trip.

19.4.5 Communication and Information

Another field that characterises SAFCC is the communication or the support for smart mobility and the smart economy. The efficient transfer of information between institutions in the city and its citizens can be realised in many ways. The seniors from CEE countries are characterised by increasing rates of use of new media. However, they still show low levels of involvement in the use of network services, although a growing number of older adults use cell phones and e-mails [69].

The use of new media in communication between citizens and the authorities appear in more and more cities [69]. Tychy, Poland may serve as an example of a city where every citizen, regardless of age, has the possibility of free registration at the town hall or through a special form (e-government system). With these solutions, senior receives notifications on the mobile phone associated with important events, including the status of the settlement of administrative cases. Also, every senior has access to SMS service to current and free information about cultural and sports events and obstacles on the road. A smart city is a city that provides up to date relevant information useful in everyday life.

The “Open Gdańsk” project [58] may be pointed as an example of enabling the inhabitants of the city by the free access to all non-confidential information generated by the city and its organisational units. The system offers access among others, to the register of city’s expenses, petitions, maps of urban plots, real estate waiting for the management, selection of sites for planting trees, information about the waiting time in offices, timetables of public transport, base of waste collection centres, base of tourist accommodation facilities, the location of hotspots, the API base of cultural events, contact details for social animators, data on traffic on the bike paths, and fault reporting system.

Social innovations in providing services related to communication for older adults in cities may be even simpler. The Telephone Rings at 5 in Setúbal, Portugal, is a project that combines companionship and mental stimulation for those who are not able to leave their

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homes alone [81]. Every day group of four older adults is invited by a volunteer moderator for discussion by a telephone. Moreover, “virtual” guided tours and debates on the current events are offered. Participants receive information and photos of places and the moderator leads a virtual visit. Similar programmes were established in Manitoba, Canada and Oakland, California.

19.4.6 Respect, Social Inclusion, Community Services, and Health Services

An interesting example of social integration and activation of seniors in Poland [40, 48], Czech Republic [42], and Slovakia [48] are UTA, senior clubs, and academies of the third age. These entities at the same time demonstrate the potential of smart people, smart governance, and smart living. As part of their activities, such institutions work with local community centres, universities, NGOs, and religious organisations. Organisations that educate seniors in addition to the traditional activities that are similar to courses in universities work closely with local entities. These organisations, therefore, fit into the model of the smart city, as most of them allows the activation of seniors who are living near to the institutions and responds to the educational needs of senior citizens. Moreover, older adults in the UTA discuss problems of the local community, because lecturers are often people known in a particular place or region.

According to the WHO definition, the age-friendly cities and communities promote social inclusion. One of the notable examples in this field is time banks set up by NGOs and municipal social welfare centres. Such social innovations are especially disseminated in Japan’s cities as “fureai kippu,” which refers to “care tickets” that are earned and exchanged by individuals when they are helping older adults in their community [36]. This system established by the Sawayaka Welfare Foundation in recent years in various forms is also spreading in cities in the Asia-Pacific region.

Senior’s Time Bank in Częstochowa, Poland, may serve as an example from CEE countries of a group of people who want to provide services to each other [51]. Each of the members has different skills and may exchange them. Every hour of work is saved in a personal account, increasing the balance. Every hour of receiving help, diminish the status of accounts. The rule is that every working hour is equal, regardless of the type of work. Many time banks have been created as a support networks in the neighbourhoods and the mutual provision of various services. For the members of the time bank ceases to be a problem, e.g., walking a dog during an illness or care for older parents and children in unforeseen situations. It becomes easier to get a lift to the city and coming back. The members of the time bank less likely to spend money at the hairdresser, instrument lessons, language lessons, massage, plumbing, and repair services. As emphasised by the founders of described the time bank this social innovation is based on equity and social engagement of older people.

In recent years a variety of telecare or e-health solutions has been developed. One of the interesting solutions developed at the local level was established in Cape Town, South Africa [3]. AgeWell programme aims at promoting the health of older adults by decreasing isolation. Pilot sites are hiring seniors to be companions for others. After training, they are matched to help specific individuals based on characteristics such as gender, language, and interests. The whole process is accompanied by mobile health technologies to increase the wellness of users as well as to support them by relevant medical and social service providers.

Given the assumption of active ageing, and the fact that seniors are living longer and postulate that the role of that group changes in society from passive recipients of services to an increasingly socially engaged citizens [70], the time banks and similar initiatives become a

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symptom of smart ageing. The SAFCC are seen here as organisms with a powerful resource of human, social, and cultural capital inherent also in older citizens. These capitals due to a large amount of free time of older adults and their desire for social involvement may be used to solve a variety of problems in local communities. Thus, it is important to draw attention to social innovation, entities of social economy, and NGOs sector in relation to an ageing population.

19.5 Conclusion

The examples presented in this chapter show the multidimensionality of the implementation of SAFCC. This concept is based on the synergy of the human factor of an ageing population (particularly various capitals of older citizens), technical solutions including AAL addressed to not only older adults, and the factors uniting technology and society such as local government and leaders, NGOs, and commercial entities offering technological innovation.

The SAFCC are a conglomerate of assumptions involving the right combination of “soft factors” with “hard solutions.” Such cities and communities are based on the needs of the ageing population and proper diagnosis of these needs conducted by institutions established for doing so. The ageing policy, which includes the creation of smart cities and communities, can be considered as an element of social policy towards the entire life cycle. Thus, the adopted solutions and the achieved outcomes from this public policy need to serve to “society for all ages” and thus, be consistent with the UN’s policies. In this way, it is possible to omit both the “gerontocentric” and the “technocentric” model of ageing policy. Activities undertaken in regards SAFCC are aimed at strengthening intergenerational solidarity, enabling them a mutual investment in each other, and sharing achievements accordance with the principles of reciprocity and equality [75].

The analysis of the selected concepts and case studies of SAFCC allows us to formulate three other areas of research. Firstly, it is reasonable to attempt to create more integrated theoretical approaches to social and technological innovation associated with ageing in the cities and communities. Secondly, it is important to study organisations of older people that focus on the dissemination and implementation of innovations and to identify barriers to their development and impact on the ageing policy. Thirdly, comparative studies of different implementations of the concept of SAFCC may be valuable if they include relations with the adopted models of the welfare state and models of the development of the silver economy.

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Summary

The chapter aims to introduce an integrated approach to concepts of (1) smart cities and (2) age-friendly cities and communities. Although these ideas are widely promoted by the European Union and the World Health Organisation, they are perceived as separate. Meanwhile, these concepts are closely intermingled in theory and practise concerning the promotion of healthy and active ageing, a universal design, usability and accessibility of age-friendly environments, reducing of the digital divide and robotic divide, and reducing of older adults' social isolation. The conclusion underlines the need for participatory creation of ambient assisted living (AAL) technologies and applications with older adults and the need for advocacy to promote AAL in the context of the silver economy especially in the Central and Eastern Europe.

Keywords

Smart Cities, Age-Friendly Cities and Communities, Ageing in Place 2.0, Age-Friendly Environments, Aids for Activities of Daily Living, Universal Design

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List of Abbreviations

AAI Active Ageing Index

AAL Ambient Assisted Living

ADLs Activities of Daily Living

CEE Central and Eastern Europe

EU European Union

ICTs Information and Communication Technologies

NGOs Non-Governmental Organisations

SAFCC Smart and Age-Friendly Cities and Communities

SCR Ranking of Medium-Sized Smart Cities

UN United Nations

UTA Universities of the Third Age

WHO World Health Organisation

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