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City Resilience to Population Ageing In the Context of Spatial (In)Accessibility The Case of Poznań and Łódź

Abstract: The ageing of the society is a serious factor affecting the prospects of urban development. Unfavourable demographic changes disturb the functioning of the urban system, thus forcing adaptive activities leading to a new state of balance in the organism of a city. The ageing of urban society requires a new look at the organisation of space in the city. The importance of planning age-friendly cities is rising fast. Due to the low mobility of the elderly, it is important to plan their direct living environment, ensuring access to facilities or areas that meet the basic needs of this particular group of urban space users. As part of the answer to the question: to what extent the cities of Poznań and Łódź are resilient to the ageing process in spatial terms, an analysis was performed of the accessibility of green areas, sports and recreation facilities, service and commercial, cultural, healthcare facilities and public transport stops for the elderly population. This resulted in the delimitation of problem areas characterised by functional and spatial deficits and the development of the two cities' resilience indexes to demographic changes, namely, ageing in spatial terms.

Keywords: city resilience, age-friendly city, active ageing in a place, accessibility

JEL: J11, J13, J14, R41, R42

1. Introduction

The concept of resilience is borrowed to a large extent from social sciences, where it was first used to study the development of children and adolescents growing in adverse living conditions (Mierzejewska, Wdowicka, 2018). It was then further adapted to other fields of science, including geography and research on cities as living organisms subjected to adverse factors interfering with the stability of their development. Taking an organismic concept of the city into consideration, one can assume that in the urban system, as in other living organisms, the balance will always be dynamic, which involves many threats or problems that may disturb the state of balance that the organism must sustain during its development process (Mierzejewska, Wdowicka, 2018; see Parysek, 2015). New needs and challenges, often destabilising the organisation of the system, force the emergence of a new organisation, which in the current context may turn out to be more adaptive than the previous one (Curtis, Cicchetti, 2004). All this emphasises the dynamic character of the city, urban resilience and adaptability of its structures to the ever-changing conditions of development (Ernstson et al., 2010; Ahern, 2011; Desouza, Flanery, 2013; Melkunaite, Guay, 2016). Resilience does not mean a lack of susceptibility or full resistance to threats and development perturbations (Borucka, Ostaszewski, 2008). According to Meerow, Newell and Stults (2016), the concept of city/urban resilience is often understood ambiguously and contradictorily in the literature. In this study, it was assumed, as Mierzejewska and Wdowicka (2018: 13) believe, that city resilience is “a process of active, positive adaptation of urban systems to changing development conditions, to phenomena and processes that may constitute more or less predictable developmental threats, including natural disasters”. City resilience is thus associated with such issues as capacity, ability, learning and adaptation.

Some of the major perturbations that threaten the development of cities are the unfavourable demographic changes manifested by the deepening demographic regression, affecting, in particular, the developed countries. In the world, and especially in Europe, a dynamic ageing process is observed, visible in the increase of the percentage of older people, caused by the extension of life expectancy and a decrease in fertility (Długosz, 2002; Kurek, 2008; Janiszewska, 2017) (Figure 1). It is anticipated that in the coming years, the process of “double ageing” of the population will be particularly noticeable, meaning a sharp increase in the share of “elderly elderly” people aged over 80 (UNDP, 2013). In Poland, according to the demographic forecast of the Central Statistical Office, by 2050 there will be a very large increase in the share of older people (65+) by 19% in cities and 16.8% in rural areas. As a result, in the last year of the forecast, the percentage of older people in rural areas will exceed 30%, while in urban areas it will approach 35% (GUS, 2014). Thus, the city will age faster than the countryside in Poland.

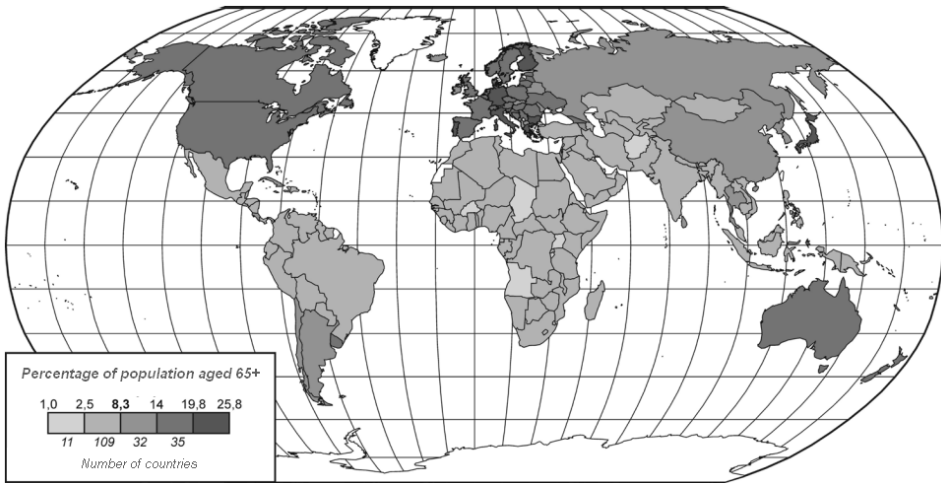


Figure 1. Society ageing on a global scale

Source: adopted from Janiszewska, 2017

The ageing of urban society requires a new look at the organisation of space in the city. It is thus more and more important to plan age-friendly cities seeking to create inclusive urban environments accessible to the elderly by providing the best possible satisfaction of their needs (Szołtysek, 2013; Tomczyk, Klimczuk, 2016; Labus, Shevchenko, 2017; Magdziak, 2017). Age-friendly cities are those that take into account the diversity of needs of this group of inhabitants, preventing their exclusion, anticipating the needs related to ageing and responding to them adequately (Kubicki, 2014).

In view of the low mobility of seniors, age-friendly cities promote the concept of ‘active ageing in’, which helps the elderly to stay in their place of residence as long as possible, while promoting the prolongation of their physical and professional activity, as well as participation in social and economic life, to improve their quality of life (Tomczyk, Klimczuk, 2016; Labus, Shevchenko, 2017).

In the face of such a policy of urban adaptation to the changing demographic conditions, the issue of (in)accessibility in spatial planning is crucial. Through the so-called exclusion, accessibility analysis leads to the analysis of inaccessibility – the identification of facilities inaccessible to older people. The importance of accessibility to local facilities increases with age, which Labus and Shevchenko aptly note (2017). Similarly, Jasiak and Swereda (2009) point out that for the elderly, the accessibility of space, which should ensure above all the safety of movement and the possibility of rest, is a priority. Studies by Trzpiot and Szołtysek (2015a) also argue that accessibility of space is important in the lives of senior citizens. Above all, access to health care facilities and public transport, as well as the older persons’ place of residence and the quality of public space (the number of public

places and their accessibility by public transport) are the main aspects influencing the quality of life of the elderly. The importance of this problem is also noted by Labus (2013), who indicates that cities focused on the needs of older people should provide access to the elderly group of residents to service, residential, recreational and green areas (parks, squares) and public facilities (e.g. sports facilities, health centres, libraries). In addition, according to the *Guide: Age-Friendly Cities* (WHO, 2007), as part of shaping their public space and transport policy, should pay attention, among others, to the presence of green areas (a place of integration of generations and relaxation) and the accessibility of public transport to the elderly.

In view of the above, the paper attempts to answer the question: to what extent the cities of Poznań and Łódź are resilient to the ageing of the society as far as the spatial dimension is concerned? It does it by assessing the spatial inaccessibility of these cities for the older residents, taking into consideration the facilities within their immediate environment essential for satisfying their needs, and by identifying the areas of functional and spatial deficits in this regard.

2. Research design

In reference to the concept of active ageing in a place, the paper assumes that the city's resilience to the ageing process in the spatial dimension is shaped by the (in)accessibility to particular facilities relevant to elderly people's needs, within their immediate neighbourhood, such as: green areas, sports and recreation facilities, service and commercial, culture, health care facilities and public transport stops.

2.1. Study area

Resilience of cities to the ageing process of their population in the context of spatial inaccessibility was examined using the example of two cities located in Poland: Poznań in the West, and Łódź, located centrally. Case analysis was carried out on the two cities that differ in the genesis of their development, size (expressed as the number of inhabitants and surface area), demographic situation and the level of socio-economic development. Łódź is a post-industrial city, while Poznań is a scientific and business centre. Łódź is a city larger than Poznań, less developed socially and economically (Table 1).

In terms of demographics, Poznań is younger than Łódź (the percentage of people aged 65+ was respectively 19.76% and 22.34% in 2016), which has been subject to more intense ageing of the population for the last thirteen years (the dynamics of the increase of the percentage of people aged 65+ in 2003–2016 were

141.08% and 134.70% respectively) (Figure 2). In terms of demographics, Łódź is the oldest voivodship city in Poland, subject, however, to slow ageing process of the population compared to other voivodship capitals. In 2003–2016, population ageing in large Polish cities was slower only in Warsaw, Kraków and Wrocław (Figure 2). Therefore, the examined cities are antagonistic in terms of their demographic situation, i.e. Łódź – an “old” city, slowly ageing, Poznań – a “young” city that is ageing faster.

Table 1. The size of Poznań and Łódź.

City size	Poznań	Łódź
Area of city [km ²]	262	293
Popultion	538 633	690 422

Source: own elaboration based on GUS BDL, 2018

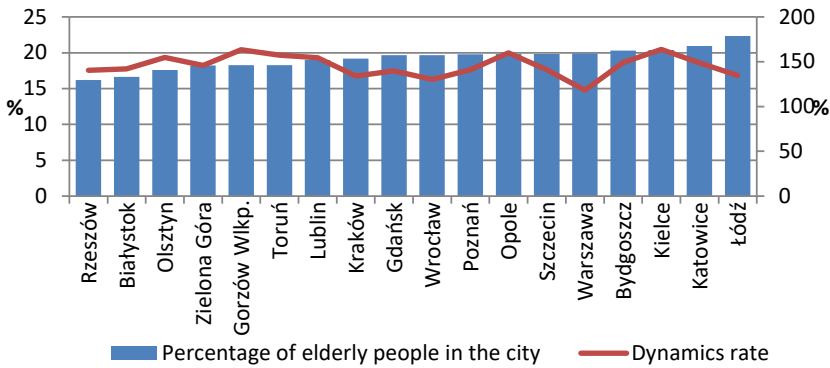


Figure 2. Percentage of older people in voivodship capital cities in 2016 against the dynamics of change in 2003–2016

Source: own elaboration based on GUS BDL, 2018

Unlike Łódź, Poznań joined the WHO Global Age-friendly Cities and Communities Network in 2016 as a proof of recognition for senior policy.

Both in Łódź and in Poznań, older people mainly live in multi-family buildings, usually prefabricated concrete high-rises. When analysing the spatial distribution of seniors’ residence in the studied cities, one can notice their concentrations in specific parts of the city. In terms of demographics, the oldest housing estates in both cities are located in the two circular zones closest to the city centre. To a lesser extent, older people are concentrated in the centres of the examined cities, mostly in tenement buildings. Residential housing areas located in peripheral areas of cities are less frequently inhabited by older people (Figure 3).

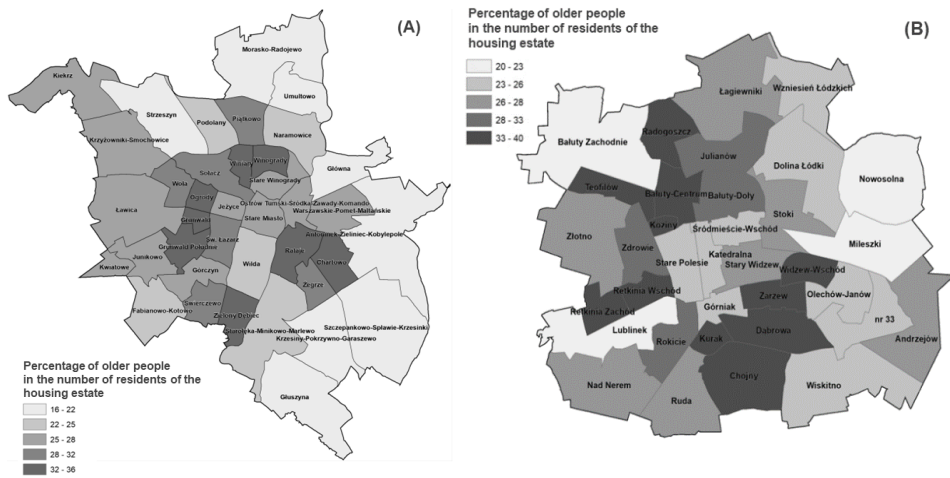


Figure 3. The distribution of older people in Poznań (A) and Łódź (B) in 2017

Source: own elaboration

2.2. Materials

Six classes of facilities relevant for satisfying the needs of older people were identified (Table 2). Information on their location was obtained from the Topographic Object Database (in Polish BDOTk10). As far as green areas and sports and recreation facilities are concerned, every access point to this type of area was included in accessibility analysis. In the case of health care facilities, data from the Integrated Patient Information System of the National Health Fund were used. The road and path network used in the analyses comes from Open Street Map (OSM). Data on the population according to the place of registration in 2017, broken down by age group, were used as point data in the analysis. People aged 60+ were considered older people in the study (see Szołtysek, 2013).

An important limitation when using the above-mentioned data is the disregard for the multi-functionality of buildings, especially service or cultural facilities located on the ground floors of multi-storey residential buildings. In the case of green areas and sports and recreation areas, the analysis includes every pedestrian access to this type of facility. Regarding access to public transport, tram and bus stops have been defined separately for both directions of travel.

Table 2. Classes of facilities relevant to the needs of older people

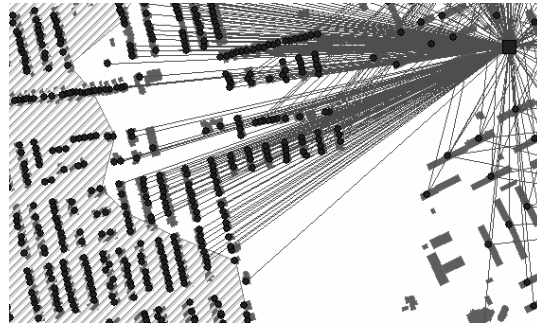
Facilities	Examples
Green areas	Parks, forests
Sport and recreation areas	Botanical or zoological gardens, sports and recreation centres, swimming pools, stadiums, complexes of summer houses, holiday resorts, allotment gardens
Health care facilities	Hospitals, Health Care Centres, doctor's offices
Cultural facilities	Libraries, recreation rooms, theatres, concert halls, museums
Commercial and service facilities	Grocery stores, clothing stores, industrial stores, markets, gastronomy
Public transport stops	Tram and bus stops

Source: own elaboration

2.3. Methods

The paper focuses on the identification of problem areas corresponding to the areas of registration of elderly people deprived of access to facilities relevant to their needs. In this manner, areas in a city characterised by functional and spatial deficits in the studied area were determined.

To determine the problem areas, an analysis of accessibility to selected facilities/areas by elderly people in their place of residence was conducted first, which by exclusion allowed to identify areas inhabited by elderly people deprived of access to the studied facilities. Pedestrian access time up to 15 min. with the walking speed of an elderly person of 3.1 km/h was taken into account (Rudzik, Nawrat-Szoltysik, 2016). The analysis was carried out using GIS methods and tools, more specifically network analysis, based on determining the matrix of the time distance of older people to selected facilities (Figures 4, 5). As part of the inaccessibility analysis, the spatial coverage and intensity of inaccessibility were determined. Coverage was expressed as the percentage of problem areas within the city, while intensity – as the average number of elderly people without access to the examined facilities per 1 ha of the problem area. Both developed measures are original city resilience indexes for demographic changes – ageing of the population – in the spatial dimension.



Explanations: dots – senior residence places; squares – accessible facilities; lines – accessibility; hatched area – problem area

Figure 4. Example of network analysis and determination of problem areas

Source: own elaboration

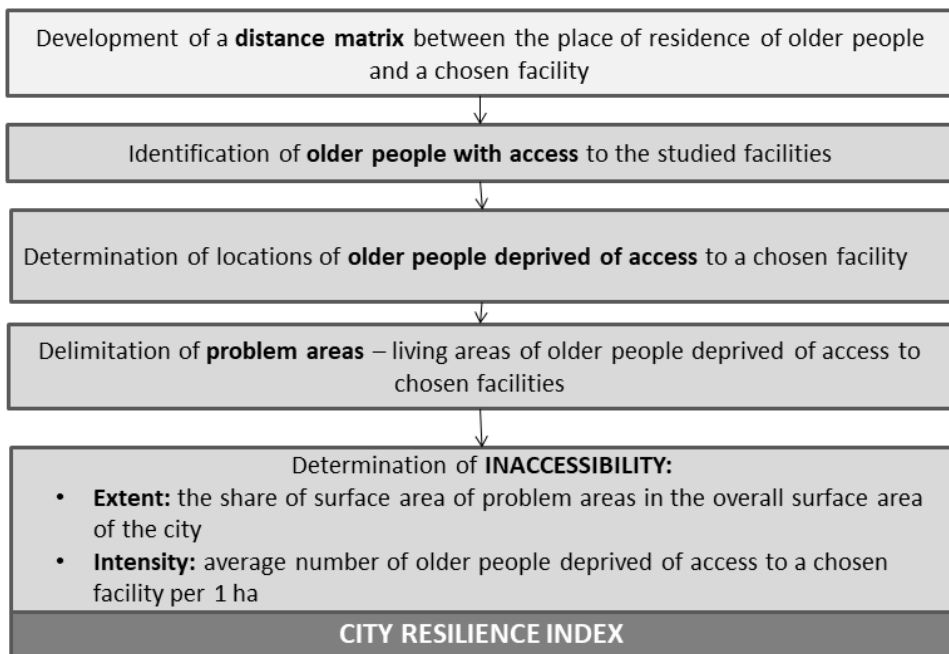


Figure 5. Research flow chart – city resilience index

Source: own elaboration

3. Results

As part of the assessment of spatial inaccessibility of the facilities relevant to the satisfaction of older people's needs, problem areas were delimited, covering the area of residence of seniors deprived of access to selected facilities.

The functional and spatial deficits identified in these problem areas in Łódź and Poznań occur both in the areas densely populated by the elderly, and in the remaining areas (Figure 6). The distribution of individual classes of problem areas according to the limited access by older people to a given group of facilities in the examined cities shows large similarities. Both in Poznań and in Łódź, in areas with significant share of older people, problems with accessing green areas and cultural facilities are particularly evident. Deficits in these areas are particularly visible in precast concrete housing estates. However, the shortage of such facilities as commercial and service buildings or public transport stops is evident in particular in the peripheral areas of the city, scarcely inhabited by older residents of these cities. Some differences, however, occur in the spatial distribution of deficits in the cities under study regarding access to health care facilities and recreation and sports areas. In Łódź, within the housing estates inhabited to a large extent by older people, there was practically no under-investment in access to health care facilities and recreation and sports areas. Problem areas in this regard are scattered throughout the city of Łódź, but not in the precast housing estates. In Poznań, however, the problem of a shortage of sports and recreation areas in housing estates largely inhabited by older people is very noticeable. In addition, unlike in Łódź, some areas of the seniors' residence in Poznań experiencing deficits of healthcare facilities were also identified (Figure 6).

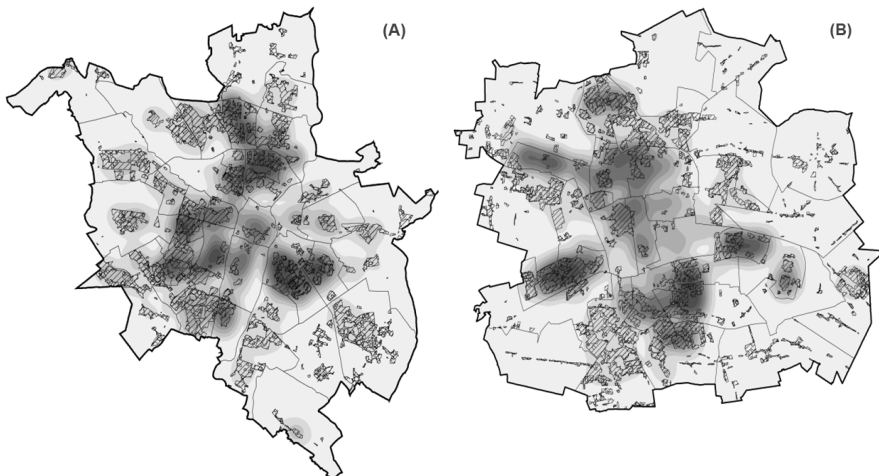
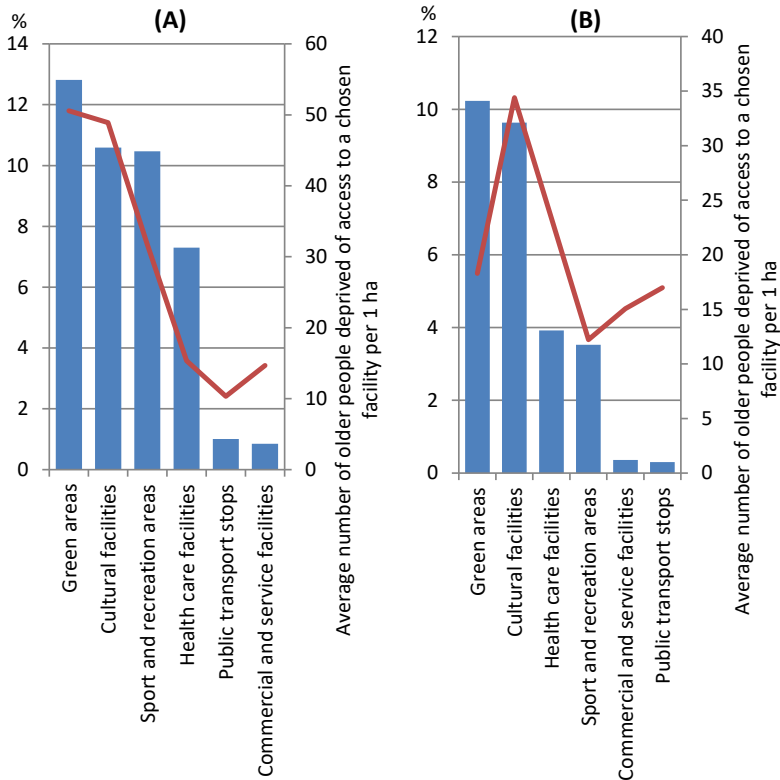


Figure 6. Spatial extent of problem areas against population density of older people in Poznań (A) and Łódź (B)

Source: own elaboration

In both Poznań and Łódź, the largest spatial extent of inaccessibility for older people concerns green areas – over 10% of the city’s area are areas with spatial and functional deficits in this regard in seniors’ immediate living environment (Figure 7). Although these problem areas constitute the largest share of the city in both analysed cases, the degree of their fragmentation expressed by the number of distinguished (isolated) areas is not the largest, but remains at an average level compared to other classes of facilities (in Poznań, about 125 areas, in Łódź about 170). In Poznań, the deficit of green areas is much more problematic than in Łódź, because it affects areas densely populated by older people. The problem areas highlighted in Poznań in this regard have the highest density, i.e. the number of elderly people deprived of access to this kind of facilities per 1 ha of land (50 people on average). In Łódź, this number is less than 20 people (Figure 7).



Explanations: bar chart – share of problem areas in the city's area; line chart – average number of elderly people deprived of access to selected facilities per 1 ha of the problem area

Figure 7. Coverage and intensity of inaccessibility of selected facilities for older people in Poznań (A) and Łódź (B)

Source: own elaboration

Another, equally problematic, functional and spatial deficit in the immediate living environment of the elderly in the studied cities is the lack of cultural facilities. The spatial range of this problem in both cities reaches about 10% (Figure 7). In the examined cities, the intensity of inaccessibility in the studied subpopulation in the delimited problem areas in this regard is the highest among the analysed classes of facilities (in Poznań, on average almost 50 people/ha, in Łódź less than 35 people/ha) (Figure 7). The importance of the problem of spatial inaccessibility to cultural facilities is strengthened by the highest degree of spatial fragmentation of problem areas among the distinguished classes of facilities – the number of such areas in Poznań is almost 250, in Łódź – approx. 320 (Figure 9).

In turn, in the living environment of older people both in Łódź and Poznań, there are very few areas underinvested in terms of public transport stops and commercial and service facilities (up to 1% of the city's area) (Figure 7). Despite the fact that this percentage in Łódź is lower than in Poznań (0.3% and 1% respectively), the intensity of this phenomenon in Łódź is higher, especially in terms of access to public transport stops (in Łódź, on average, about 17 people without access/ha, in Poznań 10 people/ha) (Figure 7). In the analysed cities and distinguished classes of facilities, spatial fragmentation of the problem of inaccessibility of the elderly to such facilities is lower – there are about 70 isolated problem areas in this regard in Poznań and only about 50 in Łódź (Figure 9).

Regarding the extent and intensity of inaccessibility of health care facilities for older people in Poznań and Łódź, the situation is different. In Poznań, problem areas characterised by the lack of access to these types of facilities by elderly people occupy a larger part of the city than in Łódź (approx. 7.5% and approx. 4% respectively), however, they mostly affect areas less populated by the elderly than in Łódź. The intensity of inaccessibility in Poznań is 15 people/ha on average and 23 people/ha in Łódź (Figure 7). In Łódź, apart from the fact that deficits are experienced in areas relatively densely populated by older people, the degree of their fragmentation is significant in comparison to the other distinguished classes of facilities and the city of Poznań (Figure 9).

The problem of sports/recreation facilities' inaccessibility within the seniors' living environment, in the context of the spatial extent of this phenomenon and its intensity, is definitely larger in Poznań than in Łódź. A significant part of this city is affected by this functional and spatial deficit (over 10%), while in Łódź, it is less than 4% (Figure 7). In addition, in Poznań, the problem areas include those with a much higher population density of older people than in Łódź (respectively around 30 people/ha and about 10 people/ha) (Figure 7). The number of highlighted problem areas of the analysed functional and spatial deficit in both cities is similar (around 150) (Figure 9). However, due to the fact that Łódź is a larger city than Poznań (both in terms of surface area and number of residents), greater fragmentation in this regard can be observed in Poznań.

It is worth noting that, while in the case of detailed analysis of the level and quality of accessibility the results obtained in the examined cities are similar, in the case of a separate assessment of the extent and intensity of inaccessibility, they are quite different (Tables 3, 4). In older people's residential areas in Poznań, there is a clear underinvestment in green areas (and, to a lesser extent, access to cultural facilities), and in Łódź – especially cultural facilities (and, to a lesser extent, green areas). On the other hand, the deficits regarding access to public transport stops and service facilities are smallest in both cities. The problem is more pronounced in Łódź, due to the much higher intensity of inaccessibility, shown by the number of older people deprived of access to these kinds of facilities per 1 ha. As far as underinvestment in sports and recreation facilities in older people's living environments is concerned, the problem is much larger in Poznań than in Łódź. On the other hand, while Łódź has fewer areas deficient in access to health care facilities, they are more densely populated by older people (Tables 3, 4).

Table 3. Assessment of coverage and intensity of inaccessibility of selected facilities in Poznań for older people

Intensity	Hight	Medium	Low
Extent			
Large	Green areas Cultural facilities		Sport and recreation areas
Medium			Health care facilities
Small			
Very small		Public transport stops	Commercial and service facilities

Source: own elaboration

Table 4. Assessment of coverage and intensity of inaccessibility of selected facilities in Łódź for older people

Intensity	Hight	Medium	Low
Extent			
Large	Cultural facilities	Green areas	
Medium			
Small		Health care facilities	Sport and recreation areas
Very small			Public transport stops Commercial and service facilities

Source: own elaboration

Comparing the coverage of the problem areas in Poznań and Łódź, each of the examined classes of facilities clearly shows their larger share in the area of the city

of Poznań than in Łódź (Figure 8). This clearly indicates that there is a greater underinvestment in Poznań for the studied facilities within the living environment of older people than in Łódź. However, taking into account the intensity of inaccessibility, in the case of green areas, sports and recreation facilities and cultural facilities, it is higher in Poznań, while in the case of health care facilities, public transport stops and commercial and service facilities – in Łódź (Figure 8).

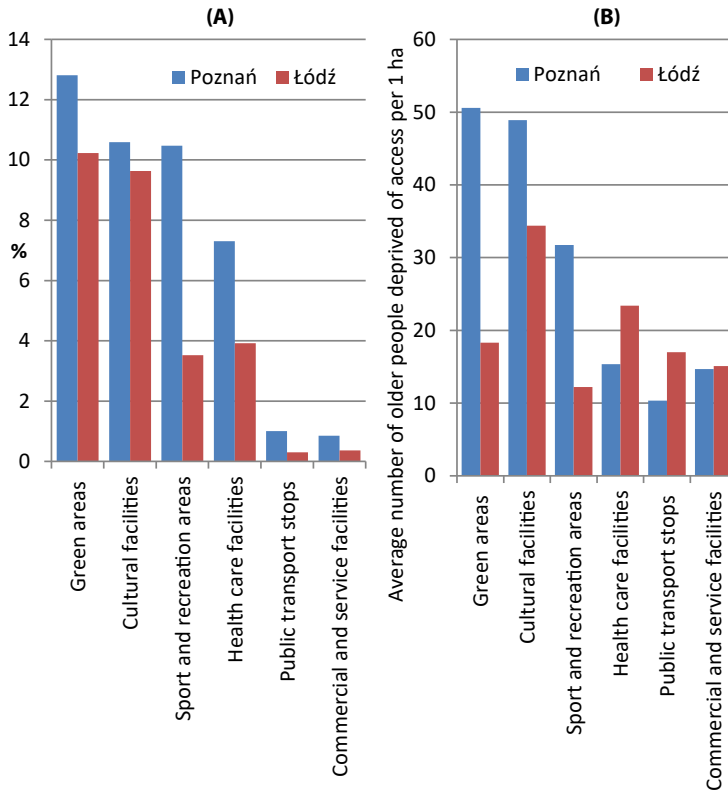


Figure 8. Coverage (A – share of problem areas surface in the city) and intensity (B – average number of older people deprived of access per 1 ha of the problem area) of inaccessibility of selected facilities for older people in Poznań and Łódź – comparison

Source: own elaboration

Comparing the number of highlighted problem areas in both cities, in the case of green areas, cultural facilities and health care facilities, it is higher in Łódź, while in terms of commercial and service facilities and public transport stops – in Poznań, and similar in both cities in the case of sports and recreation facilities (Figure 9). Due to the fact that Łódź is a larger city, also in terms of surface area, it can be claimed that the degree of fragmentation in the urban space of under-invested areas in the first three of the above mentioned categories is similar

in both cities. On the other hand, in the case of the other three analysed groups of facilities, the spatial fragmentation of functional deficits in the living environments of older people is much higher in Poznań (Figure 9).

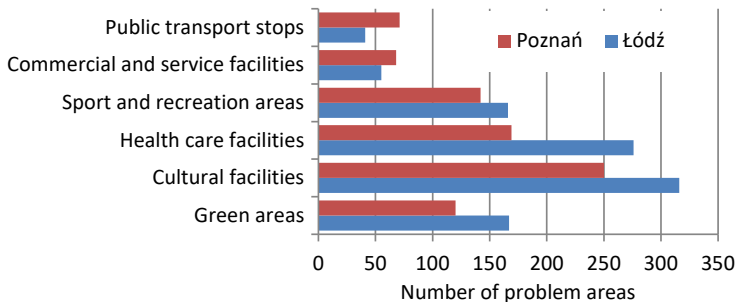


Figure 9. Spatial fragmentation of inaccessibility – number of problem areas in Poznań and Łódź

Source: own elaboration

4. Conclusions and recommendations

In the opinion of many researchers (Labus, 2011; Szołtysek, 2013; Trzpiot, Szołtysek, 2015a), Polish cities do not guarantee seniors a safe and comfortable life, they are not prepared in the context of on-going demographic changes. Simply speaking, they are not very resilient to the ageing process of the population, because older people are a group of urban users whose needs are not significantly recognised in the urban space. The results obtained partially confirm this view. Studies have shown that not all spatial planning sectors of Poznań and Łódź are friendly to seniors. This paper indicates the directions in which cities should be modified to fit the needs of older people and improve their quality of life.

Referring to the analysed forms of land development, both cities provide the elderly with an appropriate level of access only to commercial and service facilities, and public transport stops. The layout of these objects in the structure of the examined cities is therefore adequate to the spatial distribution of older people and serves their needs, as postulated in the works by Magdziak (2017), among others. However, the obtained results do not harmonise with Labus (2011), who believes that issues related to the accessibility of services and public transport are ignored in municipal policies. However, it should be noted, that the distribution of stops is not synonymous with transport accessibility in the aspect of public transport, for which the municipal authorities are responsible.

Certain deficits in urban space are already present in the case of access provided for older people to health care facilities (especially in Łódź) and sports and recreation areas (especially in Poznań).

However, the largest deficits, especially on housing estates (precast concrete) with a high share of older people, can be noticed in the case of green areas and cultural facilities that play an important role in the organisation of the local social life of this group of urban residents. In the hitherto realised policy of urban development in Poznań and Łódź, care has not been taken to ensure proper planning in older people's living environments of such important facilities as public places to meet (centres) and rest. It should be remembered that with age the psychosocial needs of the population are increasing (Garrett, 1990), which should be met (on a local scale) also in the spatial dimension. According to the WHO definition, age-friendly cities should be conducive to social integration (Tomczyk, Klimczuk, 2016). In the examined cities, however, the current way of managing the space accessible by foot does not positively influence the integration of this social group, often suffering from loneliness (see Piķuła, 2016).

The indicated functional and spatial deficits in the examined cities are mainly found in multi-family, precast housing estates. When these blocks were built in the 1970s and 1980s, the green areas and sports and recreation facilities were included in their design, however, nowadays, as a result of the ageing of the population (the increase in the number and share of older people), these facilities are insufficient to meet their needs. Komar (2015) pointed out in her research that the Polish housing estate tissue is not adapted to the needs of older people in terms of structural and non-structural barriers and that this should change in the context of the on-going demographic changes.

Studies have shown that the cities of Poznań and Łódź are not, however, equally resilient to the demographic changes in their spatial dimension. Taking into account the spatial extent and intensity of inaccessibility of facilities required by the seniors, Poznań offers a living environment less adapted to the needs of the elderly than Łódź. This is due to the spatially larger functional and spatial deficits occurring in this city. In Poznań, older people deprived of access to the analysed facilities are to a greater extent dispersed spatially than in Łódź. This is an obstacle to ensuring that the older residents of the city have adequate access to the examined facilities and further, to increasing Poznań's resilience to ageing in spatial context. As a city belonging to the group of age-friendly cities, Poznań may be more active in developing of housing, social facilities and transport facilities dedicated to older people than Łódź. However, in the spatial dimension, it has more functional and spatial deficiencies in the studied aspects than Łódź.

The organisational (functional and spatial planning) differences in the immediate living environments of the elderly observed in the cities under study and, looking wider, the housing estates with a high percentage of the elderly, may be affected by the following factors.

The genesis of Poznań and Łódź development is different, which affects the current shape of these cities. The dynamic development of the textile industry in Łódź

in the nineteenth and early twentieth century contributed to the mixing of functions within the city, while in Poznań there were areas with clearly outlined cultural, housing, industrial, etc. functions. One expression of these mixed functions in Łódź was the creation, by wealthy industrialists, of complexes consisting of the owner's house (palace), a factory, often houses for the workers (multi-family houses), and a nearby park.

A different spatial scale of inaccessibility of sports and recreation facilities in the immediate living environment of older people does not stem from the lower percentage of such areas in the usage structure of the cities under discussion, but from the differences in their location in relation to the housing estates inhabited by older people. The areas of allotment gardens play the main role here. In Poznań, they are located largely in areas not adjacent to multi-family housing estates, only in the vicinity of forests and railway areas located on the outskirts of the city. Meanwhile in Łódź, the aforementioned sports and recreation areas are located among multi-family buildings, on precast concrete estates and near the peripheral railway.

The preservation of a more extensive way of development in Łódź may result from the lesser degree of social and economic development of this city compared to Poznań, and hence – lower investment pressure resulting from lower land prices.

This lower adoption of Poznań's living environment to the needs of the elderly may also be the result of better demographic situation, as compared to Łódź, expressed in lower percentage of older people. Due to its younger society, Poznań does not yet have such a great need to adapt its spatial policy to the ongoing demographic changes as Łódź does. However, it should be borne in mind that in Poznań, the population ageing process is expected to be much more rapid, which will hopefully trigger changes in the spatial policy of this city.

Thus, it is possible to draw a highly probable conclusion that the resilience of cities to the ageing process of their populations in the spatial dimension may be determined by the genesis of the city development, its current demographic situation and its level of social and economic development.

The ageing of the population is a challenge for urban policy, especially due to the high incoherence of the elderly population and the growing diversity of their needs (see Labus, 2011; Trzpiot, Szoltysek, 2015b). Higher education of people aged 60+ and the increase in their skills may herald an increase in the expectations of the studied subpopulation and the willingness to spend time actively in urban space, which is currently poorly considered in the planning of housing estates.

Research shows that the traditional approach to spatial planning, characterised by sectoral thinking, is not entirely sufficient in the era of an ageing population. We should be aiming at integrated urban planning, taking into account the mutual spatial relations of individual components of urban space. The integration of the functional and spatial structure will ensure the emergence of a more compact and dense urban tissue, to a greater extent accessible (friendly) to older people in a spatial dimension than "sprawled" urban areas. To ensure a better quality

of life for a constantly growing group of city users – older people – more compact cities should be designed, favouring active ageing in a place, by designing mixed land-use to ensure shorter spatial distances between the various elements of development (see Jenks, Burgess, 2004; Jenks, Burton, Williams, 2005).

Summing up, the rational organisation and layout of functions in a city within the immediate living environment of older people increases the city's resilience to the ageing of its population in the spatial dimension. However, we should keep in mind that the achievement of the final goal, a resilient city, is not very likely. As Mierzejewska and Wdowicka (2018) note, it will probably never be possible to form a city that is insusceptible or fully resilient to various types of developmental perturbations, in our case to the ageing of its population. However, it is important to take measures to reduce the susceptibility of urban systems to the growing adverse demographic process and to contain the negative effects of demographic regression, manifested by shrinking.

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Odporność miasta na starzenie się populacji w kontekście (nie)dostępności przestrzennej Przypadek Poznania i Łodzi

Streszczenie: Proces starzenia się społeczeństwa jest poważnym czynnikiem wpływającym na perspektywę rozwoju miast. Niekorzystne zmiany demograficzne zaburzą funkcjonowanie systemu miejskiego, wymuszając tym samym działania adaptacyjne prowadzące do nowego stanu równowagi organizmu, jakim jest miasto. Zachodzący w miastach proces starzenia się społeczeństwa wymaga nowego spojrzenia na organizację przestrzeni w mieście. Znaczenia nabiera planowanie miast przyjaznych osobom starszym. Z uwagi na niską mobilność osób starszych ważne jest odpowiednie zaplanowanie ich najbliższego środowiska zamieszkania, zapewniającego dostępność do obiektów bądź terenów spełniających podstawowe potrzeby tej szczególnej grupy użytkowników przestrzeni miejskiej. W ramach odpowiedzi na pytanie, w jakim stopniu Poznań i Łódź są odporne na proces starzenia się społeczności w ujęciu przestrzennym, przeprowadzono analizę dostępności osób starszych do terenów zielonych, sportowo-rekreacyjnych, obiektów usługowo-handlowych, kultury, ochrony zdrowia i przystanków komunikacji publicznej. Jej efektem jest delimitacja obszarów problemowych cechujących się deficytami funkcjonalno-przestrzennymi w tym zakresie oraz wypracowanie wskaźników odporności badanych miast na zmiany demograficzne – starzenie się społeczeństwa – w wymiarze przestrzennym.

Słowa kluczowe: odporność miasta, miasto przyjazne starzeniu, starzenie się w miejscu, dostępność

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