SILESIAN UNIVERSITY OF TECHNOLOGY PUBLISHING HOUSE

SCIENTIFIC PAPERS OF SILESIAN UNIVERSITY OF TECHNOLOGY 2024
ORGANIZATION AND MANAGEMENT SERIES NO. 203

A STRATEGIC APPROACH TO INTEGRATING DEMOGRAPHIC AND TECHNOLOGICAL CHALLENGES AT THE URBAN LEVEL. THE CASE OF ŁÓDŹ

Justyna PRZYWOJSKA[1*], Aldona PODGÓRNIAK-KRZYKACZ[2]

[1] University of Lodz, Faculty of Economics and Sociology, Department of Labour and Social Policy; justyna.przywojska@uni.lodz.pl, ORCID: 0000-0002-1125-2225
[2] University of Lodz, Faculty of Economics and Sociology, Department of Labour and Social Policy; aldona.podgorniak@uni.lodz.pl, ORCID: 0000-0003-0029-0418
* Correspondence author

Purpose: The aim of this article is to examine how the authorities of the city of Łódź are shaping their policies in response to the demographic aging of the urban community in the context of the ongoing digitization of municipal services.
Design/methodology/approach: The article presents an analysis of statistical data regarding the demographic transition of the city of Łódź from 2000 to 2023, along with demographic projections for the years 2030, 2050, and 2060. Additionally, a content analysis of the city's main strategic plans was conducted to assess the implementation of a development model that addresses the digital revolution and demographic transition.
Findings: In recent decades, the population of Łódź has experienced significant aging, a trend expected to continue. The analyzed urban plans inadequately address both demographic transition and digitalization. They do not integrate these aspects, failing to address low digital literacy among seniors or the challenge of creating a smart, age-friendly city. The strategies lack actions tailored to seniors that utilize new technologies and consider their capabilities.
Research limitations/implications: The content analysis focuses exclusively on urban strategies and does not take into account the projects implemented by the city related to building a smart age-friendly city that were not planned within these strategies.
Practical implications: The study resulted in recommendations for local authorities to address demographic transition by focusing on developing a smart age-friendly city. This includes assessing the interplay between demographic aging and digitalization, considering the grey digital divide in Łódź. We suggest integrating social support with digital technologies and designing solutions tailored to seniors' needs. Engaging seniors in the strategic planning process and systematically evaluating technological solutions from their perspective is crucial.
Social implications: Shaping urban policy towards a smart age-friendly city has the potential to counteract the exclusion of older adults from the services offered by smart cities, improve their quality of life, and ensure a just transition for urban areas.
Originality/value: A protocol for evaluating urban strategies in response to demographic and digitalization challenges has been proposed. This article is intended for all those interested in the issues of smart age-friendly cities, including local authorities responsible for shaping local senior policy.

Keywords: smart city, age friendly city, strategic planning, demographic transition, smart age-friendly city**.**
Category of the paper: research paper.

1. Introduction

The combination of declining fertility rates and rising life expectancy is resulting in a rapid aging of the global population. This phenomenon has the greatest impact on urban populations. Polish cities are also undergoing notable demographic transitions, characterised by the accelerated ageing of the population. Of the population aged 60 and over, which stood at 9.8 million in Poland at the end of 2022, 64.1% were residing in urban areas (Główny Urząd Statystyczny, 2023). In 2022, seniors constituted 27.9% of the urban population. This rate is increasing at a steady pace; as recently as 2018, it was 26.9% (Główny Urząd Statystyczny, 2020). In the period leading up to 2060, the demographic forecast indicates that Poland's population will continue to age, with a gradual increase in the proportion of the population aged 60 and above. By 2060, Poland will have 11.9 million elderly individuals, representing a 21.0% increase from 2022 and accounting for 38.3% of the total population (Główny Urząd Statystyczny, 2023). Consequently, it is reasonable to anticipate a continued dynamic aging of Poland's urban population.

In response to the demographic transition of cities, the age-friendly city concept has emerged as a key approach. This concept aims to enhance the physical and social environment in cities to better support the well-being, health, and liveability of the older community (van Hoof et al., 2021). This entails the removal of barriers and difficulties encountered by older individuals when attempting to access and utilize urban services, infrastructure, and spaces, as well as the creation of conditions that facilitate activities that promote healthy and active aging (Klimczuk, Tomczyk, 2016). The World Health Organization (WHO) has proposed an Age-friendly Cities framework, which is comprised of eight domains: (1) community and healthcare, (2) transportation, (3) housing, (4) social participation, (5) outdoor spaces and buildings, (6) respect and social inclusion, (7) civic participation and employment, and (8) communication and information (WHO, 2024b). It is anticipated that adapting these domains to the needs of older people will facilitate their participation in social, professional, and political activities, thereby enhancing their well-being. The model offers guidance on urban environmental design policies and practices, with the objective of stimulating a new line of thinking about cities. A considerable number of cities have endeavored to transform their urban environments in accordance with the recommendations set forth by the World Health Organization (WHO). In 2010, the WHO Global Network on Age-friendly Cities and Communities was established with the objective of uniting cities, communities, and organizations across the globe with a shared vision of making their communities exemplary

places to age. The network currently encompasses 1606 cities and communities in 53 countries (WHO, 2024a).

Simultaneously, urban areas are undergoing a period of significant and ongoing transformation as a result of technological advancement. An illustration of these alterations is the concept of the "smart city," which integrates ecological, environmental, and social elements with pervasive information and communication technology (Przywojska, Podgórniak-Krzykacz, 2020). The implementation of urban technologies in smart cities can facilitate the social inclusion of older individuals, enhance their independence, address their health and emotional needs, and improve their safety, well-being, and quality of life (by supporting mobility, access to services, and civic participation, among other factors) (Abril-Jiménez et al., 2020; Bryant et al., 2017; Hussain et al., 2015; Li, Woolrych, 2021). These solutions employ contemporary information and communication technologies and the Internet of Things, particularly in domains such as healthcare services, including health monitoring, and care services, including assistance with activities of daily living or mobility. Nevertheless, the implementation of smart city solutions may inadvertently create obstacles for older individuals, potentially exacerbating existing inequalities. This is particularly true when the solutions fail to align with their specific needs and abilities. Indeed, older individuals tend to exhibit lower digital competencies than their younger counterparts, and they often demonstrate a slower rate of adoption and utilization of new technologies compared to younger individuals. The potential of smart cities to support aging in place can only be realized through a reconciliation of smart urban policies with age-friendly urban priorities and robust institutional governance (Woolrych, Li, 2024).

Marston and Van Hoof (Marston, Van Hoof, 2019) emphasize the necessity for the development of a novel smart age-friendly ecosystem framework, driven by both technological advancements and the imperative to encompass all citizens, including the elderly, within the social fabric. The proposed A Smart Age-friendly Ecosystem Framework (SAfE) builds upon the WHO Age-friendly Cities framework, encompassing two additional dimensions: These include the age-friendly physical space and technology and associated ICTs. Moreover, Marston et al. (2020) modified the SAfE and proposed the concept of Age-friendly Smart Ecologies (CASE) framework. The framework comprises five dimensions. The first is a new Sustainability and Environmental Factors section, which represents the broad background of urban transitions. This is followed by an Accessibility section, which consists of eight domains derived from the WHO Age-friendly City model. The next section is related to Age-friendly Technology and comprises three domains from SAfE. A new category, The Age-friendly Virtual Space, is also included. The framework then moves on to a Personal Interactions/Touchpoints section, which represents interactions and experiences that can be personal or shared with the individual. Finally, there is a People section, which acknowledges the needs of citizens.

The approaches discussed assume an adjustment of age-friendly policies in accordance with technological advances. In contrast to the aforementioned approaches, Podgórniak-Krzykacz et al. (Podgórniak-Krzykacz, Przywojska, Wiktorowicz, 2020) adopted a distinct perspective. In addition to the eight domains of Age-friendly Cities proposed by the WHO, they incorporated the domains of the smart city (six domains designated by Giffinger et al., (2010)—smart economy, smart people, smart governance, smart living, smart environment, smart mobility (complemented by the domain of open government and data) were integrated into a smart and age-friendly community approach. The authors proposed the following dimensions of a smart age-friendly city: Smart silver economy, Smart older adults, Smart governance (participation) with older adults, Smart Age-friendly Living, Smart Age-friendly Environment, Smart Age-friendly Mobility, Smart Age-friendly Public Services, Smart Age-friendly Public Spaces, Smart Monitoring of Data about Older Adults, Smart Age-friendly Mobile Application.

In conclusion, regardless of the approach taken, the concept of an age-friendly city in the context of the "smart city" movement entails an integrated transition of urban infrastructure and services, with a dual focus on technological advancement and age-friendly design. This approach presents a valuable opportunity to develop and adapt smart, digital solutions in a manner that aligns with the needs and expectations of older individuals. By doing so, it can help to address the exclusion of older people from smart city services, enhance their quality of life, and ensure a just and equitable urban transition. Equitable transition is a comprehensive approach that recognizes intelligence as the capacity to create new solutions and address existing challenges in a manner that improves quality of life and protects the environment (Podgórniak-Krzykacz, Przywojska, 2023).

The aim of this article is to explore how the authorities of Łódź are formulating policies to address the demographic aging of the city's population, especially in the context of the growing digitization of municipal services. Our focus is on determining whether the Łódź authorities, in light of the city's rapidly aging population, are planning initiatives that leverage technological solutions to improve the quality of life for seniors. Among major Polish cities, Łódź stands out for its significant projected population decline and the most unfavorable demographic changes in its age structure (Szafrańska et al., 2019).

In the first phase of the study, statistical data from Statistics Poland (GUS) was analyzed to assess the aging population in Łódź and to outline the future course of demographic transition. The second phase involved a content analysis of the city's key strategic documents (the city development strategy and the social problems resolution strategy) to evaluate the extent to which they incorporate a development model that addresses both the digital revolution and demographic changes. The assumption is that local authorities have the ability to influence social policy in shaping Polish cities to be inclusive for all age groups by leveraging modern digital solutions. Additionally, consistent with the views of researchers like Johnsen (2018) and Rahman (2016), municipal governments are seen as key players in strategic public sector planning. In contemporary welfare states, municipalities are not only responsible for numerous citizen-focused services and functions but also manage considerable public resources.

Some of these tasks and services are assigned by the central government, while others arise from local political decisions and strategic choices. Regardless of whether these responsibilities are mandated or self-initiated, municipalities need effective policies and strategies to manage and utilize public resources. The main goal of strategic planning is to produce tangible public goods, such as social services, environmental sustainability, and urban identity, all aimed at improving well-being and promoting development. Additionally, the creation of these goods is often achieved through public-private partnerships and inter-institutional collaboration (Percoco, 2016).

Another assumption involves the role of local strategies in shaping local policies. It posits that local development strategies and social issue strategies represent the local policy responses to the challenges and complexities of sustainable urban development. The issues identified in these documents, along with their associated priorities and actions, reveal how urban challenges are perceived and the approaches adopted in local development policy. Additionally, local strategies act as a bridge between EU operational programs and urban projects (Fioretti et al., 2020).

The municipal development strategy forms the cornerstone of long-term municipal activities and management, as stipulated by Articles 4 and 9 of the Act of December 6, 2006, on the Principles of Development Policy, and Article 10e (1) of the Act of March 8, 1990, on Municipal Self-Government. Cities aiming to meet their sustainable development goals must create tailored, locally-driven action plans. This strategy is essential for guiding and ensuring the continuity of development policy, securing external funding for local projects, and integrating sectoral policies and stakeholder activities around shared priorities. Additionally, the Social Problems Resolution Strategy, mandated by Article 16b of the Social Assistance Act of March 12, 2004, is a sectoral strategy focusing on social development and the prevention of social exclusion at the municipal level.

To achieve the research objective of our study, we formulated the following research questions:

- What is the extent of the demographic aging of the population of Łódź, and what are the projected future trends?
- Do the diagnoses and strategic analyses identify the scope of smart city solutions implemented in Łódź?
- Do the diagnoses and strategic analyses provide insight into the demographic structure of the Łódź population and projected demographic trends?
- Do the diagnoses and strategic analyses identify any disparities in access to digital services and solutions in Łódź, taking into account the age of the population and their digital competence?
- Do the strategic diagnoses identify potential technological solutions to enhance the quality of life for senior citizens in Łódź?

- Do the strategic plans of Łódź include the development of smart cities?
- Has a plan of action been devised for improving the quality of life of seniors in Łódź?
- To what extent have the strategic plans for Łódź incorporated the use of modern technologies to facilitate activities designed for the senior population?
- Have the strategic plans of Łódź identified seniors as important stakeholders in the process of planning and monitoring the city's development?
- Have rules for monitoring their implementation been included in the municipal plans?
- Have the costs of implementing the planned measures and sources of funding been identified in the municipal plans?

2. Method

An assessment of the aging of the population of the city of Łódź was conducted based on selected statistical data from the Statistics Poland, including those from the 2021 Census. The indicators listed in Table 1 were subjected to analysis.

Table 1.
Indicators selected for the analysis of the aging population of Łódź

Indicator	**Scope of data**
Total population	2000-2023 forecast 2030, 2050, 2060
Population aged 60-64	2000-2023 forecast 2030, 2050, 2060
Population aged 65-69	2000-2023 forecast 2030, 2050, 2060
Population aged 70-74	2000-2023 forecast 2030, 2050, 2060
Population aged 75-79	2000-2023 forecast 2030, 2050, 2060
Population aged 80-84	2000-2023 forecast 2030, 2050, 2060
Population aged 85 and over	2000-2023 forecast 2030, 2050, 2060
Population aged 60 and over	2000-2023 forecast 2030, 2050, 2060
Share of population aged 60 and over in total population	2000-2023 forecast 2030, 2050, 2060
Elderly dependency ratio (aged 65 and over)	2000-2023

Source: own elaboration.

The second method utilized in the study was the content analysis of urban strategies. The analysis and evaluation focused on two key documents:

- The "City of Łódź Development Strategy 2030+," attached to Resolution No. L/1535/21 of the City Council of Łódź, dated November 17, 2021.
- Resolution No. XXIV/570/16 of the City Council of Łódź, dated February 3, 2016, concerning the adoption of the "Social Policy 2020+ for the City of Łódź - Social Problems Resolution Strategy".

Additionally, supplementary documents for the development strategy of Łódź were analyzed:

- The "Assessment of the Relevance of the Integrated Development Strategy for the City of Łódź up to 2020+ in the Light of Changing Legal and Economic Conditions".
- The "Integrated Development Strategy of Łódź 2020+ Strategic Diagnosis of Łódź. Synthesis".

In analyzing the content of Łódź's strategic documents, we considered the key features of strategic planning in the public sector as outlined by researchers (Bryson et al., 2018; Tutaj, 2018):

- The complementarity of problem-solving and the treatment of the municipality as part of an environment that presents both opportunities and developmental threats, which also influences the achievement of success in operations.
- A future-oriented approach, meaning the resolution of current issues through the lens of future implications.
- An initial focus on a broad agenda, followed by a transition to a more selective action-oriented focus.
- Emphasis on systems thinking, which involves understanding the dynamics of the entire planned system, including the interconnections between its constituent subsystems.
- Special attention to stakeholders, thereby making strategic planning an approach to practical politics that secures legitimacy, acceptance, and credible commitments.
- An outcome-oriented approach, which emphasizes the achievement of goals through the effective implementation of previously planned tasks.

Based on these considerations, we developed a protocol for evaluating urban strategies that incorporates both the formal principles of strategic planning within a municipality and the substantive aspects of urban policy aimed at creating smart, senior-friendly cities, as discussed in the introduction section (Table 2).

Table 2.
Protocol for evaluating urban strategic plans in addressing demographic challenges and urban digitalization

Scope of evaluation	Evaluation criteria	Indicator	Score
Diagnosis of a Smart Age-Friendly City	The extent of use of digital tools in the core areas of age-friendly city has been identified	D.1	0-2
	The demographic structure of the city is characterized and demographic forecasts are described	D.2	0-2
	The scope of digitization within the administration, households, businesses, and the extent of technology utilization in the city and local economy has been identified.	D.3	0-1
	The impact of digitization on the quality of life of seniors in the city has been identified	D.4	0-1
	The digital competency needs of seniors have been identified	D.5	0-1

Cont. table 2.

Strategic analysis of a smart age-friendly city	There is a reference to the issue of digitization	A.1	0-1
	There is a reference to the demographic aging of the local community	A.2	0-1
	There is a reference to the scale of exclusion or digital inclusion of seniors	A.3	0-1
	There is a reference to technological solutions for improving the quality of life of older residents	A.4	0-1
Development of a smart and senior-friendly city declared in the mission statement	There is a reference to digitization/ICT and the development of an age-friendly city	M.1	0-2
Strategic vision of a smart age-friendly city	There is a reference to digitization/ICT and the formation of an age-friendly city	W.1	0-2
Pathway of goals for developing a smart age-friendly city	There is a reference to digitization/ICT and addressing demographic challenges in the adopted strategic goals/priorities	C.1	0-2
	There is a reference to the issue of digitization/ICT and responding to demographic challenges in the adopted operational objectives/action lines	C.2	0-2
	There is a reference to the issue of digitization/ICT and responding to demographic challenges in the planned projects/activities	C.3	0-2
	Integrated solutions for the development of a smart age-friendly city have been planned	C.4	0-1
Monitoring	Indicators for monitoring development in relation to digitization and demographic transition have been defined	MO.1	0-2
	Principles for monitoring development related to digitization and demographic transition have been established	MO.2	0-2
Funding	Costs for implementing digital solutions and age-friendly initiatives in the city have been determined	F.1	0-2
	Sources of funding for the implementation of digital solutions and age-friendly initiatives in the city have been identified	F.2	0-2
Participation	Older adults (or their representatives) participated in the development of the urban strategy	P.1	0-1
	Older adults (or their representatives) have been identified as stakeholders in the implementation of the development strategy	P.2	0-1
	The principles for the participation of older adults (or their representatives) in the implementation of smart age-friendly city solutions have been established	P.3	0-1
overall score (33 max).			

Source: own elaboration.

3. Results and Discussion

3.1. A Demographic Analysis of the Aging Population in Łódź

The population of the city of Łódź has been declining since the late 1980s, initially due to economic transformation, the collapse of the textile industry, social changes, and migration, and currently, primarily as a result of negative natural population growth (Kazimierczak, Szafrańska, 2019; Szpakowska-Loranc, Matusik, 2020). Due to the dynamic and prolonged depopulation, Łódź is classified as a shrinking city (Wichowska, 2023). Between 1989 and

2005, the city lost 100,000 residents, and between 1989 and 2016, the population declined by 18.43%, making it the fastest depopulating large city in Poland and one of the fastest in Europe. In 2000, the city's population was just under 800,000, while in 2023, it was approximately 652,000, with projections suggesting further depopulation to 458,400 by 2060 (Table 3). This demographic shrinking process continues despite recorded economic recovery. Scholars indicate that demographic factors, particularly the aging population, are significant contributors to this phenomenon (Haase et al., 2021).

Over the past several decades, the population of Łódź has undergone a significant aging process, characterized by an increasing proportion of elderly individuals within the overall population. In 2000, individuals aged 60 and above accounted for approximately 21% of the city's total population. By 2023, this figure had risen to 31.5% (Table 3). According to demographic projections by the Statistics Poland (GUS), this aging trend is expected to continue in the future, with the proportion reaching 40% by 2050. Additionally, the old-age dependency ratio, expressed as the number of people aged 65 and over per 100 people aged 15 to 64, has been increasing. Currently, in 2023, this ratio stands at 41, having risen from 23.3 in 2005.

The structure of the elderly population in Łódź is diverse in terms of age. In 2023, the largest group of seniors consisted of individuals aged 65-69, who accounted for 24.93% of the total elderly population (those over 60 years old). In the previous years, from 2010 to 2020, the dominant group was the youngest cohort of seniors, those aged 60-64. The smallest groups continue to be those aged 80-84 years (8.17%) and those aged 85 and over (9.2%). However, over the past 20 years, the number of the oldest individuals, aged 85 and above, has increased by 100%. Projections from the Central Statistical Office (GUS) up to 2060 indicate a continued systematic increase in the number of the oldest age groups, particularly those over 80 years old.

Table 3.
Demographic transition indicators of Łódź population

Indicator	**2000**	**2005**	**2010**	**2015**	**2020**	**2023**	**2030**	**2050**	**2060**
Total population, including:	798 418	767 628	730 633	700 982	673 003	652 015	621 350	507 970	458 440
60-64 years	38 020	35 893	60 088	62 214	50 895	39 514	33 580	40 247	27 539
65-69	40 359	33 781	31 918	53 863	54 845	51 249	32 694	43 792	33 675
70-74	b.d.	34 407	29 064	27 764	46 002	46 887	41 363	39 817	34 670
75-79	b.d.	30 699	27 793	24 118	22 618	32 081	41 026	29 989	35 452
80-84	b.d.	20 121	21 669	20 741	18 086	16 798	29 810	20 008	28 953
85 years and older	b.d.	9 509	14 374	18 667	19 782	19 035	18 644	30 442	30 521
60 years and older	167 314	164 410	184 906	207 367	212 228	205 564	197 117	204 295	190 810
Share of population aged 60 and over in total population (%)	20,96	21,42	25,31	29,58	31,53	31,53	31,72	40,22	41,62
Elderly dependency ratio (in persons)	b.d.	23,30	23,90	30,80	37,70	41,00	-	-	-

Źródło: (Główny Urząd Statystyczny, 2024).

The primary causes of the aging population in Łódź include a decline in birth rates and an increase in average life expectancy, the postponement of motherhood, the outflow of working-age individuals due to relatively high unemployment, and the process of suburbanization, which primarily involved younger and middle-aged people relocating to the suburbs of Łódź (Haase et al., 2021; Szafrańska et al., 2019).

3.2. Content analysis of local plans

The results of the conducted evaluation of city plans for responding to demographic challenges and urban digitization are presented in Table 4.

Table 4.
Results of the content analysis of urban strategic plans in Łódź

Indicator	Scoring Development strategy (DS)	Scoring Social problems resolution strategy (SPRS)	Justification of the evaluation
D.1	0	0	Both strategies failed to diagnose the potential use of digital solutions in activities for seniors
D.2	2	2	Both strategies acknowledge adverse demographic trends, including the aging of the Łódź population
D.3	0	0	Neither strategy specifies the scope and potential for utilizing digital solutions in the city
D.4	0	0	Neither strategy recognizes the impact of digitization on the quality of life for seniors
D.5	0	0	Both strategies lack the identification of seniors' needs regarding digital skills
A.1	1	0	In the SWOT analysis included in the development strategy, there is a reference to the deficit of the city's digital infrastructure. The trend of digitization was not recognized in the social problems resolution strategy
A.2	1	1	Both strategies identified the demographic aging of Łódź's population as a strategic condition
A.3	0	0	SWOT analyses did not address the issue of digital exclusion of seniors
A.4	0	0	SWOT analyses did not identify opportunities to implement technological solutions in activities for seniors
M.1	1	1	In the Łódź development strategy, a mission was not formulated, but horizontal principles concerning the use of technology in the city were established. In contrast, the social problems strategy declares intergenerational solidarity in its mission; however, this mission does not address the challenge of digitization
W.1	0	0	The strategic vision is established only in the city's development strategy, but it does not address the improvement of seniors' quality of life or the use of modern technologies for this purpose. It identifies Łódź as a hub for the activity and common good of other stakeholders, such as academics and business entities
C.1	0	1	Addressing demographic challenges is classified as a strategic objective only in the Social Problems Resolution Strategy (SPRS). Neither strategy recognizes objectives related to digitization at this level

Cont. table 4.

C.2	1	1	Both strategies include operational goals (programs) aimed at improving the quality of life for seniors. However, there is again a lack of references to digitization at this level of goals
C.3	2	1	The city's development strategy separately programs actions for implementing digital solutions and for supporting seniors. Conversely, the social problems strategy neglects digitalization initiatives and only provides for the continuation of existing actions for seniors that began in 2012
C.4	0	0	Both strategies lack integration of technological actions with the development of an age-friendly city
MO.1	1	0	In the city's development strategy, one indicator is dedicated to monitoring digitalization, while another focuses on activities for the elderly. The Social Problem Resolution Strategy (SPRS) references future specific programs as the source for indicators and data
MO.2	1	1	Both strategies outline general principles for monitoring their implementation
F.1	0	1	In the city's development strategy, implementation costs are specified only for selected strategic initiatives (without detailed calculations). In the Social Problems Resolution Strategy (SPRS), costs are provided without information on their calculation
F.2	0	1	Only the Social Problems Resolution Strategy (SPRS) briefly indicates potential funding sources for actions supporting seniors
P.1	0	0	There is a lack of information about the involvement of older adults in the development of both municipal plans
P.2	0	1	In the SPRS, collaboration with active senior communities in Łódź was planned from the beginning of 2016 for the development and implementation of the second edition of the "Aktywizacja 60+" program. However, there is no information on the role of older adults in the implementation of the city's development strategy
P.3	0	0	Both strategies fail to specify the need for the participation of older adults in the implementation of digital solutions aimed at improving their quality of life
Overall scoring	10/33	11/33	

Source: own elaboration based on (Polityka Społeczna 2020+ Dla Miasta Łodzi - Strategia Rozwiązywania Problemów Społecznych, 2016; Strategia Rozwoju Miasta Łodzi 2030+, 2021).

The content analysis of the two urban plans has enabled us to develop conclusions concerning both the formal requirements imposed on such documents and substantive issues related to programming actions aimed at improving the quality of life for seniors amidst technological advancements. A significant concern is the absence of an update to the Social Problems Resolution Strategy (SPRS) for Łódź. This document, created in 2016, is inconsistent with the current city development strategy, which was adopted in 2021. The SPRS indicates its alignment with the previous city development strategy, stating that the strategic objectives outlined in the SPRS are also intended to support the tasks set by the Łódź Integrated Development Strategy 2020+. This situation contradicts the recommendations of scholars (Korzeniak, 2012; Markowski, Drzazga, 2023; Wojnicka-Sycz, 2018) regarding the need for integration and complementarity of programs and actions in public sector strategic planning. An integrated approach to planning involves merging strategies, policies, plans, and actions,

and facilitates collaboration among various stakeholders. The lack of such integration hinders a systematic approach to urban development.

Both strategies received low total scores in the evaluation, with the city development strategy scoring 4 out of 11 in the diagnostic section and the SPRS scoring 3 out of 11. Several factors contributed to these low scores. Firstly, neither strategy addressed digitalization phenomena, including the level of digitalization in the municipality or the preparation of seniors for life in a digital world. Specifically, the SRPS completely omitted this challenge, with no references to digitalization throughout the document. On the other hand, the city development strategy acknowledged the general trend of technological progress but did not delve into it either generally or in the context of Łódź. Both strategies prioritize the challenge of demographic transition and diagnose the particular scale of demographic aging in Łódź. Both documents also present unfavorable demographic forecasts for the city, with the SPRS providing a more comprehensive analysis of demographic challenges.

Unfortunately, neither of the urban plans integrates both perspectives—technological advancement and population aging. In the case of the Social Problems Resolution Strategy (SPRS), this omission is a direct consequence of its complete disregard for the phenomena of digitalization, smart cities (S.C.), and information and communication technologies (ICT). On the other hand, the Łódź Development Strategy fails to systematically address both contemporary challenges. This is a disheartening observation, especially in light of the declared integrated approach of both documents towards urban policy. As researchers explore the concept of a smart age-friendly city, the autorithies of demographically aging and shrinking city of Łódź does not perceive technological progress as an opportunity to improve the situation for its senior residents.

Interestingly, in the document "Assessment of the Current Status of the Łódź Integrated Development Strategy until 2020+ in Light of Changing Legal and Economic Conditions", T. Markowski explicitly states that while the general objectives of the previous Łódź development strategy have not fundamentally become outdated, the strategy's operational and programmatic layers do not account for several new phenomena that have emerged in the socio-economic and political environment of the city. The expert highlights phenomena such as an aging society and new challenges arising from the development of the information society and the rapid pace of implementing "smart technologies". Furthermore, he recommends incorporating megatrends into the strategy, which represent the greatest challenges for city economies in the 2020-2030 period. These megatrends include: Smart Cities; Big Data; Connectivity and Convergence (Connected Living); Artificial Intelligence, Automation and Robotics; Accelerating Urbanization; Growing Global Population; Aging Society; Sustainability; Depletion of Natural Resources; Renewable Energy Sources; Globalization; and the Sharing Economy. Our examination of the existing local plans reveals a significant gap in addressing the in-depth analysis and diagnosis of Łódź's situation and its context concerning the megatrends of smart cities and population aging.

From a formal perspective, a critical component of the diagnostic section of a local strategy is strategic analysis. Both documents fulfill this requirement. SWOT analysis was employed to assess the strengths and weaknesses of Łódź in relation to its environment. Table 5 presents the strategic conditions related to the subject of our study.

Table 5.
Strategic Conditions for the Development of Łódź in Relation to the Trends of an Aging Population and Technological Revolution

Łódź City Development Strategy 2030+	**Strenghts**	**Weaknesses**
	-	Significant distortion of demographic structure, accelerated aging, and depopulation Low broadband internet coverage in the city
	Opportunities	**Threats**
	-	Adverse demographic trends in Poland threatening cities with low social capital and poor economic conditions
Social Problems Resolution Strategy	**Strenghts**	**Weaknesses**
	-	Shortage of day care centers Shortage of social care facilities for adults with intellectual disabilities Shortage of personnel trained in dementia care
	Opportunities	**Threats**
	-	Aging population Low public awareness of elderly and sick care

Source: own elaboration based on Social Policy 2020+ for the City of Łódź - Social Problems Resolution Strategy, 2016; Łódź City Development Strategy 2030+, 2021 (Polityka Społeczna 2020+ Dla Miasta Łodzi - Strategia Rozwiązywania Problemów Społecznych, 2016; Strategia Rozwoju Miasta Łodzi 2030+, 2021).

As illustrated in Table 5, the phenomenon of the technological revolution is not considered a strategic condition for the development of Łódź. The SWOT matrix only briefly mentions the deficit in digital infrastructure within the city. This indicates a lack of a strategic approach to implementing technological solutions for the sustainable and smart development of Łódź.

Both strategies, however, address the challenge of an aging population. The SPRS prioritizes this demographic challenge at the highest possible level, highlighting a growing trend in this regard. It is difficult to ascertain the weight assigned to this challenge in the development strategy, as the SWOT analysis did not incorporate the weighting of individual factors or anticipated directions of change. Notably, both strategic analyses treat the aging population challenge exclusively as a negative phenomenon. There are no references to the silver economy, the concept of age-friendly smart cities, or even Healthy and Active Ageing, which advocate for a proactive approach to seeking social and economic potentials within demographic transition (Podgórniak-Krzykacz, Przywojska, Warwas, 2020; Podgórniak-Krzykacz, Przywojska, Wiktorowicz, 2020).

In the SWOT analysis contained in the SPRS, the aging population issue is traditionally viewed through the lens of deficiencies in social services and infrastructure, with aging being linked to disability. The strategic diagnosis lacks references to digital exclusion among seniors, digital competencies, and technological solutions that facilitate seniors' independent living, access to medical care, communication with family and friends, and access to knowledge and

information. This analysis prompts reflection that in response to the phenomenon of demographic aging, the authorities in Łódź propose a defensive strategy (mini-mini) – a struggle for survival by minimizing the impact of weaknesses and external threats on the functioning and development of the municipality. The content analysis of both documents leads us to conclude that this configuration of conditions in the SWOT matrix is, in fact, a regrettable consequence of an exceptionally superficial diagnosis of the situation of the elderly in Łódź, lacking an analysis of their needs, expectations, limitations, and the potential for utilizing technological innovations in the city's senior policy.

The planning sections of the analyzed documents reflect their limited diagnoses and analyses concerning the two urban challenges of interest. In this section of the evaluation, the development strategy scored 4 points, while the Social Problems Resolution Strategy received 3 points out of 11.

According to strategic planning principles, strategies should formulate a mission that defines the organization's purpose (Dziemianowicz, 2012). In our case, this mission should explain the role of the Łódź municipality in city development policy. We assumed that the description of this role would reflect the urban challenges of interest.

In the Łódź development strategy, the mission was not explicitly formulated. However, it is worth noting that the document outlines horizontal principles of the strategy, which include references to urban intelligence, technology, and social cohesion: *Intelligent cities – rapid technological development presents a significant opportunity for Łódź, especially in terms of technology and solutions that facilitate the transmission of information and resources more quickly and efficiently. Łódź aims to utilize this as extensively as possible to achieve sustainable development and address social needs. Łódź is a city that integrates data from various areas and uses it for effective management and enhancing resilience*. It is thus surprising that urban intelligence development was not considered a strength in the SWOT analysis. The horizontal principles also refer to striving for high quality of life for all (people of all ages and in different situations). However, there is no direct mention of an age-friendly city, despite the strategy identifying a significant and increasing proportion of elderly people in Łódź's population.

The mission was explicitly formulated in the SPRS, but it does not reference technological progress. Instead, it relates to the city's social policy during demographic transition: *Łódź restores intergenerational bonds and thus builds intergenerational solidarity. No resident will be marginalized due to their age. Everyone is included.*

Another analyzed element of the strategies is the strategic vision, which represents the desired future state of the municipality that the implementation of the strategy aims to achieve. In both analyzed documents, the visions do not explicitly address the subject of our research. Interestingly, the authors of both documents attempt to present Łódź as a cohesive and inclusive city, highlighting important stakeholders such as academics and entrepreneurs (in the Łódź City Development Strategy 2030+) or new residents and groups with special needs (in the Social Problems Resolution Strategy). However, there is a notable absence of references to the elderly

population, which currently constitutes a significant portion of the city's population and is projected to increase in the coming years. Paradoxically, Łódź, as a city with a notably aging population, fails to address this critical demographic challenge in its future vision.

In the next step of the substantive analysis, we examined the goal pathways outlined in the strategies. For the Social Problems Resolution Strategy (SPRS), this stage of our investigation proved particularly challenging due to the strategy's lack of clarity and inconsistent terminology concerning the various levels of goals and actions. For instance, the authors of the strategy sometimes used terms such as *additional tasks* and *additional tasks that currently do not have the status of strategic programs* instead of adhering to the declared division into strategic areas, strategic goals, programs, and actions.

Furthermore, within the strategic area „F: Social Solidarity – A Model Standard of Social Policy", the previously existing goal structure is replaced by a list of needs. For example, under the strategic goal F.1: *Adapt the system of social care institutions and services to the needs of clients*, the identified need is listed as: "11. *Establishment of a day care center*". This entry is difficult to interpret as a specific task to be accomplished. We wish to emphasize that the format of SPRS does not facilitate understanding of its content and assumptions. It is advisable to consider a more user-friendly approach to drafting such documents if the aim is to attract stakeholders willing to collaborate in implementing the city's development policy.

In general, addressing the demographic transition has been assigned to Strategic Goal *B.3: Integrate Seniors as an Important and Active Group in the Development of Łódź*, which is supported by Program B.3.1: *Activation 60+ (Second Edition)* and Program B.3.2: *Development of the Łódź Senior Card Program*. We are pleased with the declared perception of seniors as active participants in the planning and implementation of urban policy initiatives. The authors state in the goal description:

Due to the demographic processes occurring in Łódź for many years, seniors are a significantly overrepresented group in the city's population. While this phenomenon is a result of a broader demographic context, it is this group that particularly suffers from its negative consequences. Efforts to combat the aging of Łódź should not—intentionally or unintentionally—imply a negative attitude toward the elderly. On the contrary, they must be actively invited to contribute to the city's success. Goal B3 is directed at seniors as partners, not merely as clients of the system.

"Once again, we regret that this positive and proactive attitude is not reflected in the analysis of strategic conditions and the vision for the social sphere of Łódź's functioning. Moreover, the strategy lacks specific actions to achieve the strategic goal, and Program B.3.2 is essentially a component of Program B.3.1 (the Senior Card was already created in the previous edition of the program)—making it difficult for us to interpret the author's intentions here. The city authorities intend to continue and expand tasks undertaken in earlier years as part of the Activation 60+ Program from 2012, in the form of the program's second edition.

During the first edition of the Activation 60+ Program, the following tasks were carried out: Neighborhood Centers for Active Seniors were established, the City Senior Council was formed, the Civic Dialogue Commission on Demographic Policy and Intergenerational Cooperation was established, an internet portal for Łódź seniors was created, the Senior Card project was launched, the New Technologies—Computer Training and Workshops project was initiated, the "60+ Volunteering" project was launched, the "Łódź Senioralia" event was organized, housing exchange facilitation for the elderly was introduced, and cooperation with NGOs, senior clubs, and Universities of the Third Age was conducted to support the elderly".

The strategy also suggests guidelines that should be taken into account when preparing the second edition of the program. However, it is difficult to determine how these guidelines fit within the document's goal framework. Such an approach to the issues of interest to us—presented as a continuation of a previously implemented program—leads us to believe that Łódź's senior policy, as part of the city's social policy, is more focused on the ad hoc implementation of individual projects and initiatives rather than on a comprehensive strategic approach.

References to digitalization in the Social Problems Resolution Strategy (SPRS) are found only in *STRATEGIC AREA A: KNOWLEDGE – EFFICIENCY – EMPATHY: Systemic Management of Social Policy*, which includes Strategic Goal A.1: *Overcome Divisions and Organize a Coherent System for Managing Social Policy*, and Program A.1.1: *Intelligent Social Policy*. Among the actions proposed is the *Implementation of modern IT tools to support the delivery of integrated social services*. However, there is no indication of the target customers for these services.

The goal path designed in the *Łódź City Development Strategy 2030+* is clear. This enabled us to compile a set of goals related to the subject of our study in a tabular format (Table 6).

Table 6.
Overview of Objectives for Shaping a Smart Age-Friendly City in the Łódź City Development Strategy 2030+

SUBJECT AREA	**OPERATIONAL OBJECTIVES**
Objective I: A Strong and Resistant City of Łódź	
A city of high-quality education	Development of lifelong learning, including for seniors
A city of efficient administration	The objective is to enhance the quality of service and the organisational culture by considering the viewpoint of the residents and optimising the operational efficiency of the office. This will be achieved through the digitalisation of municipal services and the growing significance of e-services
A city responding to demographic changes	Implementation and development of health prevention programs tailored to various resident groups based on age, health risks, and existing conditions, including the promotion of physical activity. Promotion of active aging and support for seniors in Łódź. Equalizing opportunities for people with disabilities, including through activation programs. Elimination of architectural barriers in public spaces and ensuring the accessibility of public transportation for all users, with particular attention to individuals with disabilities, the elderly, and children. Innovative forms of senior care. Support for extending the professional activity period of seniors

Cont. table 6.

Łódź a city that effectively shapes space	Horizontal implementation of universal design principles that meet and consider the needs of everyone, developed in alignment with the ideals of an accessible and inclusive city
Łódź a city of intelligent infrastructure	Dynamic traffic management through advanced systems for traffic control, parking, and payment management. Smart energy management in the city and municipal facilities. Intelligent management of the city's housing and municipal resources. Smart management of social policies. Development of a real-time information system, enabling online data access and collection for residents and application developers. Innovative development of wireless networks and telecommunications standards, including 5G. Enhancement and continuous monitoring of public service telecommunication infrastructure with a focus on (cyber)security
Objective II: Social and Economic Development of the City of Łódź	
Logistics hub	Supporting the development of logistics by the potential of local companies in the information and telecommunications technology industries.
Łódź: A 2.0 Production and Service City	It is recommended that support be provided to facilitate the growth of local enterprises in the information and telecommunications technology sectors, thereby contributing to the expansion of production capabilities
Objective III: Łódź: A City Meeting Stakeholder Expectations	
Łódź a digital city	Integrated solutions available in the form of applications for residents of Łódź. Integrated solutions available in the form of applications for visitors and investors. Prevention of digital exclusion. Development of a digital information exchange system. New models for managing open data and big data based on public-public partnerships
OBJECTIVE IV: Delightful City of Łódź	
Zero-emission and clean city	It is imperative to facilitate active mobility by modifying public spaces, squares, and streets to align with the requirements of non-motorized users. This process must consider the perspectives of individuals with disabilities, the elderly, and children

Source: own elaboration on the basis of Łódź City Development Strategy 2030+, 2021

A crucial process for ensuring the effective implementation of the strategy is its monitoring. Both analyzed strategies include general principles for monitoring the implementation of the strategy, without specific reference to digitization and demographic transition. However, indicators related to the objectives relevant to our research are included only in the Łódź City Development Strategy 2030+ concerning Strategic Goal I – A Strong and Resilient Łódź. Among the 46 indicators assigned to this goal, two pertain to digitization (the number of e-services offered by the municipal administration, the number of electric fleet units), while one monitors actions aimed at older adults (the number of seniors using city services). These indicators do not allow for effective monitoring of the strategy's implementation in the area of our interest.

In the sections of the strategy dedicated to project financing, there is a notable absence of information regarding the costs and sources of funding for implementing digital and age-friendly solutions in the city. This information is only partially addressed in the SPRS (Social Problems Resolution Strategy). The SPRS delineates the costs involved, yet fails to provide the requisite details regarding their calculation. Furthermore, it offers only a cursory identification of potential sources of funding for activities oriented towards the senior population. The absence of financial planning for the implementation of these actions indicates

that Łódź's senior policy, as a component of the city's social policy, is more likely based on the ad hoc execution of individual projects and initiatives dependent on the availability of external funding.

It is notable that the scope of participation related to the development, implementation, and monitoring of both documents has been assessed as low. The Łódź City Development Strategy 2030+ does not include any information on participatory processes involving seniors, which suggests that such processes may not have been conducted. Conversely, the SPRS assumed collaboration with active senior communities in Łódź in planning and implementing the second edition of the "60+ Activation" program, beginning in 2016. Our analysis indicates an insufficient inclusion of seniors in shaping the development and social policies of Łódź, as well as a limited application of a human-centered approach that places seniors at the core of the planning process.

4. Conclusions and recommendations

The objective of this study was to analyze the urban development policy of Łódź in response to the challenges posed by demographic aging and the increasing digitization of municipal services. The research methodology was based on a secondary analysis of statistical data and key strategic plans of Łódź, namely the Łódź City Development Strategy 2030+ and the Social Problems Resolution Strategy (SPRS). The study concentrated on the measures set forth in these strategies with the objective of enhancing the quality of life for the elderly, with a particular emphasis on those based on the implementation of technological solutions.

The findings indicate that both strategies address the issues of demographic transition and digitization. However, demographic transition is perceived as a challenge and a potential weakness of the city, while digitization is not considered a strategic development condition for Łódź. The strategies do not explicitly integrate these two issues, either as the problem of low digital competence among seniors—which results in digital exclusion, a particularly severe issue in Poland (Garwol, 2019; Kwiatkowska, 2022; Susło et al., 2019; Szmigielska et al., 2012)—or as the challenge of building a smart, age-friendly city. It is our contention that the city authorities have failed to adequately diagnose and consider situational factors during the formulation of both strategies. Our analysis of statistical data revealed a notable trend of population aging in Łódź, which is expected to continue in the coming years. Concurrently, the city is engaged in the technological revolution and developing smart infrastructure. It is therefore recommended that the city's development and social policies concerning the elderly be aligned with the goal of building a smart age-friendly city. A more comprehensive strategic diagnosis is imperative, one that considers the interconnections between the challenges of demographic aging and digitization, including the extent of the "grey digital divide" in Łódź.

Both strategies acknowledge the importance of the senior population in addressing the salient issue of demographic transition. Nevertheless, the strategic objective pertaining to this phenomenon is only delineated in the SPRS. We posit that it is essential to update the SPRS, in particular, and to establish a strategic goal related to the creation of a smart age-friendly city in both strategies. The planned actions in the current strategies can be classified into two categories: (1) those directed at seniors, focusing on their activation, support, and increasing access to municipal services—addressed in both strategies; and (2) those not specifically targeted at seniors but at all residents, involving the implementation of modern technologies—addressed only in the city development strategy. A review of the strategies revealed the absence of actions that simultaneously target seniors, are based on new technologies, and are designed to account for their capabilities and digital competencies. While some responses to digitization are mentioned—such as the operation of a senior-oriented website, the provision of computer training, and the organization of workshops (SPRS), as well as the implementation of innovative senior care solutions (city development strategy)—these measures only partially meet the needs of seniors and do not consider their digital competencies. Conversely, a considerable number of technology-based initiatives, which are intended for all residents, including seniors, fail to address their particular requirements. In light of these considerations, we propose a more comprehensive approach that integrates social support and senior activation with the use of digital technologies, and that designs technological solutions tailored to the needs and abilities of seniors.

The human-centered approach, which prioritizes the needs and perspectives of older adults in the planning and implementation of urban development and social policies, has not been fully integrated into either strategy. It is only with respect to the second edition of the "60+ Activation" program that the involvement of seniors is planned. It is therefore recommended that seniors be involved in participatory processes during the formulation of strategic documents, goal setting, and action planning. Furthermore, the human-centered design methodology should be applied during the implementation phase, with seniors involved in designing specific solutions. This approach will ensure that senior policy is aligned with their needs and digital competencies. Additionally, it is recommended that systematic assessments of the effectiveness and usability of implemented technological solutions be conducted from the perspective of seniors.

References

1. Abril-Jiménez, P., Rojo Lacal, J., de los Ríos Pérez, S., Páramo, M., Montalvá Colomer, J. B., Arredondo Waldmeyer, M.T. (2020). Ageing-friendly cities for assessing older adults' decline: IoT-based system for continuous monitoring of frailty risks using smart city infrastructure. *Aging Clinical and Experimental Research, 32(4),* 663-671. https://doi.org/10.1007/S40520-019-01238-Y
2. Bleja, J., Neumann, S., Krüger, T., Grossmann, U. (2022). *A Human-Centered Design Approach for the Development of a Digital Care Platform in a Smart City Environment Implications for Business Models.* WWW '22: Companion Proceedings of the Web Conference 2022. https://doi.org/10.1145/3487553.3524854
3. Bryant, N., Spencer, N., King, A., Crooks, P., Deakin, J., Young, S. (2017). *IoT and smart city services to support independence and wellbeing of older people.* 25th International Conference on Software, Telecommunications and Computer Networks, SoftCOM 2017. https://doi.org/10.23919/SOFTCOM.2017.8115553
4. Bryson, J.M., Edwards, L.H., Van Slyke, D.M. (2018). Getting strategic about strategic planning research. *Public Management Review, 20(3),* 317-339. https://doi.org/10.1080/14719037.2017.1285111
5. Dziemianowicz, W. (2012). *Planowanie strategiczne: poradnik dla pracowników administracji publicznej.* Ministerstwo Rozwoju Regionalnego, 3-192.
6. Fioretti, C., Pertoldi, M., Busti, M., Van Heerden, S. (2020). *Podręcznik Strategie Zrównoważonego Rozwoju Obszarów Miejskich* (S. Van Heerden, Ed.; EUR 29990 PL). Urząd Publikacji Unii Europejskiej. https://doi.org/10.2760/917340
7. Garwol, K. (2019). Stopień umiejętności korzystania z technologii cyfrowych a wykluczenie społeczne na przykładzie osób niepełnosprawnych, starszych i ubogich. *Nierówności Społeczne a Wzrost Gospodarczy, 58,* 47-68. https://www.ceeol.com/search/article-detail?id=790372
8. Giffinger, R., Gudrun, H., Haindlmaier, G. (2010). Smart cities ranking: an effective instrument for the positioning of the cities? *ACE: Architecture, City and Environment, 4(12),* 7-26. https://doi.org/10.5821/ACE.V4I12.2483
9. Główny Urząd Statystyczny (2020). *Sytuacja osób starszych w Polsce w 2018 roku.* https://stat.gov.pl/obszary-tematyczne/osoby-starsze/osoby-starsze/sytuacja-osob-starszych-w-polsce-w-2018-roku,2,1.html
10. Główny Urząd Statystyczny (2023). *Sytuacja osób starszych w Polsce w 2022 roku.* https://stat.gov.pl/obszary-tematyczne/osoby-starsze/osoby-starsze/sytuacja-osob-starszych-w-polsce-w-2022-roku,2,5.html
11. Główny Urząd Statystyczny (2024, July 15). *Bank Danych Lokalnych*. https://bdl.stat.gov.pl/BDL/start

12. Haase, A., Bontje, M., Couch, C., Marcinczak, S., Rink, D., Rumpel, P., Wolff, M. (2021). Factors driving the regrowth of European cities and the role of local and contextual impacts: A contrasting analysis of regrowing and shrinking cities. *Cities, 108,* 102942. https://doi.org/10.1016/J.CITIES.2020.102942
13. Hussain, A., Wenbi, R., Da Silva, A.L., Nadher, M., Mudhish, M. (2015). Health and emergency-care platform for the elderly and disabled people in the Smart City. *Journal of Systems and Software, 110,* 253-263. https://doi.org/10.1016/J.JSS.2015.08.041
14. Johnsen, Å. (2018). Impacts of strategic planning and management in municipal government: an analysis of subjective survey and objective production and efficiency measures in Norway. *Public Management Review, 20(3),* 397-420. https://doi.org/10.1080/14719037.2017.1285115
15. Kazimierczak, J., Szafrańska, E. (2019). *Demographic and morphological shrinkage of urban neighbourhoods in a post-socialist city: the case of Łódź, Poland*. https://doi.org/10.1080/04353684.2019.1582304
16. Klimczuk, A., Tomczyk, L. (2016). Smart, Age-friendly Cities and Communities: the Emergence of Socio-technological Solutions in the Central and Eastern Europe. *Active and Assisted Living*, 335-359. https://doi.org/10.1049/PBHE006E_CH17
17. Korzeniak, G. (2012). Zintegrowane planowanie rozwoju miast: propozycja modelu. *Problemy Rozwoju Miast, 9(3),* 59-71.
18. Kwiatkowska, E.M. (2022). E-recepta a wykluczenie cyfrowe-wokół potrzeby tworzenia rozwiązań prawnych. *Horyzonty Polityki, 13(42),* 5569. https://doi.org/10.35765/HP.2163
19. Li, M., Woolrych, R. (2021). Experiences of Older People and Social Inclusion in Relation to Smart "Age-Friendly" Cities: A Case Study of Chongqing, China. *Frontiers in Public Health, 9,* 779913. https://doi.org/10.3389/FPUBH.2021.779913/BIBTEX
20. Markowski, T., Drzazga, D. (2023). *System zintegrowanego planowania rozwoju w warunkach polskich. Założenia – zasady kierunkowe – koncepcja*. Wydawnictwo Uniwersytetu Łódzkiego.
21. Marston, H.R., Van Hoof, J. (2019). Who Doesn't Think about Technology When Designing Urban Environments for Older People? A Case Study Approach to a Proposed Extension of the WHO's Age-Friendly Cities Model. *International Journal of Environmental Research and Public Health, Vol. 16(19),* 3525. https://doi.org/10.3390/IJERPH16193525
22. Marston, H.R., Shore, L., White, P.J. (2020). How does a (Smart) Age-Friendly Ecosystem Look in a Post-Pandemic Society? *International Journal of Environmental Research and Public Health, Vol. 17(21),* 8276. https://doi.org/10.3390/IJERPH17218276
23. Percoco, M. (2016). Strategic Planning and Institutional Collective Action in Italian Cities. *Public Management Review, 18(1),* 139-158. https://doi.org/10.1080/14719037.2014.969758

24. Podgórniak-Krzykacz, A., Przywojska, J. (2023). Skoncentrowana na ludziach transformacja miast w kierunku inteligentnego zrównoważonego rozwoju. *Władza Sądzenia, 25,* 70-87. https://doi.org/10.18778/2300-1690.25.05
25. Podgórniak-Krzykacz, A., Przywojska, J., Warwas, I. (2020). Silver economy as a response to demographic challenges in polish regions: realistic strategy or Utopia? Innovation: *The European Journal of Social Science Research.* https://doi.org/10.1080/13511610.2020.1736011
26. Podgórniak-Krzykacz, A., Przywojska, J., Wiktorowicz, J. (2020). Smart and Age-Friendly Communities in Poland. An Analysis of Institutional and Individual Conditions for a New Concept of Smart Development of Ageing Communities. *Energies, Vol. 13(9),* 2268. https://doi.org/10.3390/EN13092268
27. Polityka Społeczna 2020+ Dla Miasta Łodzi - Strategia Rozwiązywania Problemów Społecznych (2016).
28. Przywojska, J., Podgórniak-Krzykacz, A. (2020). A Comprehensive Approach: Inclusive, Smart and Green Urban Development. *Problemy Ekorozwoju, 15(1),* 149-160. https://doi.org/10.35784/PE.2020.1.16
29. Rahman, M.A.U. (2016). Urban sustainability through strategic planning: A case of metropolitan planning in Khulna city, Bangladesh. *Journal of Urban Management, 5(1),* 16-22. https://doi.org/10.1016/J.JUM.2016.06.001
30. Strategia Rozwoju Miasta Łodzi 2030+ (2021).
31. Susło, R., Paplicki, M., Drobnik, J. (2019). Wykluczenie cyfrowe osób starszych lub niepełnosprawnych. In: *Spółdzielnie socjalne oraz organizacje pozarządowe wsparciem dla zagrożonych wykluczeniem* (pp. 173-189). E-Wydawnictwo. Prawnicza i Ekonomiczna Biblioteka Cyfrowa. https://www.repozytorium.uni.wroc.pl/dlibra/publication/108426/edition/99642?
32. Szafrańska, E., Coudroy De Lille, L., Kazimierczak, J. (2019). Urban shrinkage and housing in a post-socialist city: relationship between the demographic evolution and housing development in Łódź, Poland. 34, 441-464. https://doi.org/10.1007/s10901-018-9633-2
33. Szmigielska, B., Bąk, A., Hołda, M. (2012). Seniorzy jako użytkownicy Internetu. *Nauka, 2,* 141-155. https://ruj.uj.edu.pl/xmlui/handle/item/4360
34. Szpakowska-Loranc, E., Matusik, A. (2020). Łódź – Towards a resilient city. *Cities, 107,* 102936. https://doi.org/10.1016/J.CITIES.2020.102936
35. Tutaj, J. (2018). Strategie rozwoju w jednostkach samorządu terytorialnego. *Społeczności Lokalne. Studia Interdyscyplinarne, 2*.
36. van Hoof, J., Marston, H.R., Kazak, J.K., Buffel, T. (2021). Ten questions concerning age-friendly cities and communities and the built environment. *Building and Environment, 199.* https://doi.org/10.1016/J.BUILDENV.2021.107922
37. WHO (2024a). About the Global Network for Age-friendly Cities and Communities - Age-Friendly World. https://extranet.who.int/agefriendlyworld/who-network/

38. WHO (2024b). The WHO Age-friendly Cities Framework. https://extranet.who.int/agefriendlyworld/age-friendly-cities-framework/
39. Wichowska, A. (2023). Shrinking cities in Poland: identification of the phenomenon and its socioeconomic implications. *Ekonomia i Prawo. Economics and Law, 22(4)*, 825-839.
40. Wojnicka-Sycz, E. (2018). Koncepcja i wymiary zintegrowanego planowania rozwoju w jednostkach samorządu terytorialnego. *Zarządzanie i Finanse, 16(1.1),* 257-273.
41. Woolrych, R., Li, M. (2024). Exploring the role of smart cities in supporting ageing-in-place in Chongqing, China. *Australasian Journal on Ageing, 43(2),* 264-270. https://doi.org/10.1111/AJAG.13301