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Accessibility of Public Transport for Older People in Non-Urban Areas in Poland

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Abstract

The accessibility of public transportation for elderly people in Poland's rural and peri-urban regions represents a pressing concern, particularly in light of the nation's aging demographic and the growing phenomenon of transport exclusion. This study delves into the myriad challenges faced by seniors in accessing reliable transportation, emphasizing the detrimental consequences of limited mobility, such as heightened social isolation and diminished access to essential services. The paper scrutinizes the underlying causes of transport exclusion, including the curtailment of bus and rail services, inadequacies in stop infrastructure, and vehicle fleets that fail to accommodate the needs of the elderly. Through an in-depth case study of the Konin Agglomeration, the disparities in accessibility are brought to the forefront, underscoring the imperative for systemic modernization of transport networks. Proposed solutions, such as the implementation of demand-responsive transport systems and comprehensive infrastructure enhancements, are explored as avenues to mitigate these issues. The article posits that by adopting integrated strategies and prioritizing accessibility, policymakers can significantly enhance the mobility and social inclusion of elderly citizens. Such measures not only improve the quality of life for this vulnerable population but also contribute to the broader goals of sustainable transport development and societal cohesion.

Keywords: Public transport, aging population, rural accessibility, transport exclusion, sustainable mobility

Introduction

An aging society is a challenge not only in a demographic context but also in terms of infrastructure and transportation. Problems related to the accessibility of public transport for elderly people are particularly noticeable in rural and non-urban areas.

According to data from the Central Statistical Office, the number of people of post-working age per 100 working individuals increased from 25 in 2002 to 40 in 2023 (Central Statistical Office, 2024). Similar trends are observed across Europe, indicating an increased demand for transport services tailored to the needs of this demographic group (Eurostat, 2024).

The motivation for undertaking considerations and research on this topic is the growing importance of adapting transport systems to the changing demographic structure. Population aging generates new mobility challenges that have not yet been fully addressed, especially in rural and less urbanized areas. As the number of elderly people increases, understanding how the development of transport infrastructure can meet their needs by improving accessibility and the quality of transport services becomes crucial. The author's reflections and research bring a fresh perspective to this issue, focusing on the possibilities of better adapting transportation to the requirements of an aging society, which could contribute to improving the quality of life for seniors and the efficiency of transport systems in the future.

Methods

The research utilized quantitative and qualitative methods to analyze the accessibility of public transportation for elderly individuals in Poland's rural and peri-urban regions. Statistical analyses were performed on data obtained from the Central Statistical Office (2024), Government Analysis Center (2023), and Eurostat (2024) to evaluate changes in transport services and their impact on elderly populations. Descriptive and inferential statistics were applied to identify trends in transport exclusion.

A case study of the Konin Agglomeration was conducted, during which surveys and structured interviews were completed with elderly residents and transport operators to gather insights into barriers to accessibility. Municipal reports and transport operator data were analyzed to assess the alignment of current systems with accessibility standards. Additionally, vehicle fleet and stop infrastructure data were examined to evaluate the extent of modernization and compliance with accessibility requirements.

These methods provided a comprehensive understanding of the challenges and potential solutions related to transport accessibility for elderly populations.

Results

The analysis revealed significant challenges in the accessibility of public transportation for elderly individuals in rural and peri-urban areas in Poland. Statistical data indicated a 42% reduction in regional and suburban bus lines between 2014 and 2021, leading to a 61.3% decrease in passengers transported (Government Analysis Center, 2023). This decline was particularly evident in sparsely populated regions, exacerbating transport exclusion among seniors.

In the Konin Agglomeration, the study identified disparities in public transport accessibility. While urban areas such as Konin city benefited from modernized low-floor buses and improved electronic information systems, peripheral towns showed limited progress. Only 17% of pedestrian crossings met accessibility standards by 2022, and 69% of bus stops in the region were deemed completely unsuitable for individuals with limited mobility (City Council of Konin, 2022).

Interviews with elderly residents highlighted barriers such as insufficient infrastructure, long distances to stops, and the lack of demand-responsive transport services. While MZK Konin achieved a full low-floor bus fleet, PKS Konin's fleet remains predominantly high-floor, limiting accessibility for seniors and individuals with disabilities.

Figures and Tables illustrating these findings include:

Figure 2: Partially low-floor buses being phased out of use in Poland.

Figure 3: Fully low-floor buses are now standard across urban areas.

Table 1: Decline in bus services and passenger numbers (2014–2021).

These results underscore the urgent need for systemic improvements in transport networks, especially in rural and peri-urban regions. Detailed analysis of these findings is provided in the Discussion section.

Discussion

Transport exclusion in rural and peripheral areas is becoming an increasingly serious problem, especially for the elderly. Limited access to public transport significantly hinders the daily functioning of seniors, who struggle to reach medical services, shops, or public institutions. The elimination of many bus and rail connections leads to the social isolation of this group, depriving them of the opportunity to participate in social life. This issue is worsening in sparsely populated areas, where the lack of alternatives, such as private transportation, is particularly felt. As a result, the elderly

become increasingly dependent on external assistance, losing their independence. Transport exclusion not only limits mobility but also affects the quality of life of seniors in rural areas.

The scale of the problem

In Poland, the scale of transport exclusion is steadily increasing, which is a result of the decline in the number of bus lines and route lengths, presented in Table 1. Between 2014 and 2021, the number of regional and suburban bus lines decreased by 64% and 33%, respectively (Government Analysis Center, Department of Analysis, 2023). The reduction in the number of bus lines has led to a decrease in the number of passengers transported in Poland from 431.5 million in 2014 to 167 million, which represents a drop of 61.3% (Government Analysis Center, Department of Analysis, 2023). Such a decrease in bus number and in km driven concerns 15 out of total 17 regions in Poland (signed in red in Table 1).

Table 1: The percentage change in the number {szt} and length {km} of bus lines in Poland in the years 2014 – 2021 (decrease in red and increase in green).

ZMIANA PROCENTOWA (2014 do 2021)	ogółem {szt.}	ogółem {km}	regionalne {szt.}	regionalne {km}	podmiejskie {szt.}	podmiejskie {km}
POLSKA	-38%	-42%	-64%	-65%	-33%	-30%
DOLNOŚLĄSKIE	-35%	-36%	-58%	-67%	-32%	-24%
KUJAWSKO-POMORSKIE	-57%	-56%	-85%	-81%	-51%	-45%
LUBELSKIE	-46%	-50%	-77%	-63%	-37%	-43%
LUBUSKIE	-24%	-33%	-29%	-55%	-23%	-17%
ŁÓDZKIE	-33%	-36%	-57%	-59%	-28%	-20%
MAŁOPOLSKIE	-50%	-48%	-55%	-56%	-49%	-42%
MAZOWIECKIE	-63%	-67%	-76%	-74%	-61%	-64%
OPOLSKIE	31%	20%	-71%	-61%	47%	45%
PODKARPACKIE	21%	25%	1%	7%	24%	32%
PODLASKIE	-42%	-7%	-68%	-55%	-34%	25%
POMORSKIE	-26%	-29%	-23%	-33%	-26%	-28%
ŚLĄSKIE	-53%	-61%	-54%	-61%	-52%	-61%
ŚWIĘTOKRZYSKIE	-41%	-61%	-92%	-91%	-33%	-47%
WARMIŃSKO- MAZURSKIE	-52%	-61%	-79%	-74%	-41%	-50%
WIELKOPOLSKIE	-28%	-36%	-68%	-75%	-21%	-18%
ZACHODNIOPOMORSKIE	-15%	-27%	-55%	-66%	0%	9%

([https://sejm.gov.pl/INT10.nsf/klucz/ATTD2VJL2/\\$FILE/z00292-o1_7.pdf](https://sejm.gov.pl/INT10.nsf/klucz/ATTD2VJL2/$FILE/z00292-o1_7.pdf))

The reduction in the number of bus lines and passengers in Poland is one of the consequences of the "vicious cycle in public transport," where a decrease in the number of passengers leads to a reduction in transport services, which in turn causes a further decline in the number of people using public transport. As a result of the reduction in transport services, potential public transport passengers opt for individual transport (Ciechanski, 2023).

The effect of the "vicious cycle in public transport" in Poland is a phenomenon primarily observed in peripheral areas, where population decline, low demand for public transport, and transport exclusion lead to the closure of additional bus and railway lines. This, in turn, forces residents to rely more heavily on private cars, further weakening the public transport system in these areas (Kaczorowski, 2019) (Czarnowski, Rostkowski, and Skwierawski, 2024) (Gadzinski and Goras, 2019).

Transport exclusion in Poland primarily affects elderly individuals, who, as the problem worsens, lose the ability to actively and normally function due to significant limitations in access to medical services, shops, cultural institutions, and opportunities to participate in social life (Gadzinski and Goras, 2019).

Transport exclusion in rural and peripheral areas in Poland is an increasing problem, particularly affecting the elderly. Between 2014 and 2021, the number of bus lines dropped by 42%, which resulted in a 61.3% reduction in the number of passengers transported. This phenomenon leads to a "vicious cycle in public transport," where a decline in passenger numbers results in a reduction of transport services, further limiting transport availability. In sparsely populated areas, seniors lose the ability to freely access medical services, shops, and social life. The lack of alternatives, such as private transport, deepens their isolation. As a result, elderly individuals become more dependent on external assistance and lose their independence.

Public transport (PT) accessibility in the Konin agglomeration

After the administrative reform in 1999, the areas of the former Konin voivodship were incorporated into the Greater Poland Voivodeship, which resulted in changes in the management of public services, including transportation. Over the years, the decline of public transportation in smaller towns forced municipalities to tighten cooperation. Since 2012, with the creation of the Konin Agglomeration Functional Area, joint efforts have been made to improve transportation accessibility. In 2021, in the face of new challenges, the Konin Agglomeration Association was established to better coordinate investments and the development of public transportation in the region.

The center of the Konin Agglomeration is the city of Konin, which plays a key economic and service role. However, sub-centers have developed in Konin County, such as Old City in the south and Slesin in the north (Konin City Hall, 2020).

In the Konin agglomeration area, there are municipal operators such as MKK Konin, which provides urban transportation in Konin and the surrounding towns. The second interregional operator is PKS Konin, which

operates local connections within the Konin agglomeration and long-distance routes.

PT in the Konin center

Communication in Konin is clearly varied in terms of the availability of routes depending on the day of the week. MZK Konin offers significantly more connections on weekdays, due to the needs of people commuting to work, schools, and other institutions. On Saturdays, the number of routes is limited, while on Sundays, many lines offer only sporadic connections, often concentrated on main routes. On weekdays, morning routes (between 5:00 AM and 8:00 AM) are densely scheduled, adjusted to work and school start times. Afternoon peak hours (2:00 PM - 5:00 PM) are also well serviced. In the evening, after 6:00 PM, the number of routes decreases, and the last buses usually stop running between 9:00 PM and 10:00 PM. On weekends, routes in the morning and evening are less frequent, which can be challenging for people relying on public transport during these times.

MZK Konin also operates seasonal lines during the summer (e.g., line PG). These seasonal lines often serve popular recreational spots, such as swimming areas, reflecting the seasonal nature of tourist traffic.

Availability of Subregional Transport in the Konin Agglomeration

The PKS Konin bus network connects major cities in the region, such as Konin, Slupca, Kolo, Sompolno, Slesin, and Kleczew, with numerous smaller towns. Noteworthy are the bus stops located near railway stations in Konin, Kolo, Slupca, Wysokie, and Turzynow, allowing convenient transfers to trains. PKS Konin maintains connections:

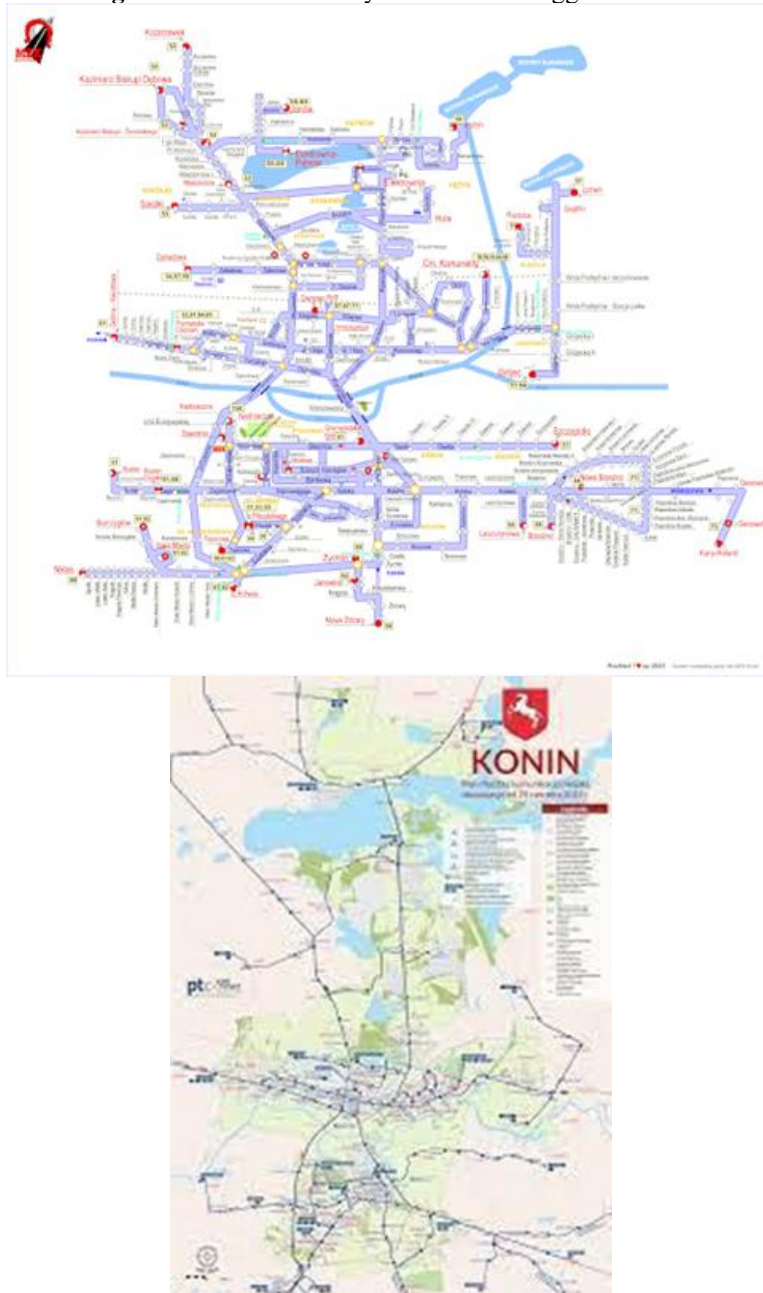
- from Konin to Skulsk, Sompolno, Slesin, Izbica Kujawska, and Kleczew. Services run daily, with increased frequency on weekdays,
- from Slupca to Orchowo, Ostrowite, and Piotrowo, primarily on weekdays, with consideration for school days.
- from Slesin to Konin via Mikorzyn and Honoratka, as well as to the Grunwaldzka transfer hub. Connections are available on both weekdays and weekends, with a limited number of services on Saturdays and Sundays. Additionally, there are routes to Sompolno and Kolo, where regular connections are available on weekdays, but the number of services is significantly reduced on weekends,
- from Kolo to Izbica Kujawska, Sompolno, and Przedecz, with frequent services in the morning and afternoon. On weekends, the services are limited.

Services are limited on weekends and public holidays, which may cause difficulties in commuting, especially in smaller towns. Many routes

operate primarily on weekdays, increasing the risk of transport exclusion in peripheral areas.

Despite the extensive network, the availability of public transport in the region is uneven, which may affect residents of small towns, especially outside peak hours and on weekends.

Figure 1: PT in Konin city center and the agglomeration



(<https://www.google.com/search?q=mapa+transport+publiczny+konin+region&oq>)

Transport in Konin and the surrounding region primarily relies on services provided by MZK Konin and PKS Konin. MZK Konin operates urban transport within Konin and nearby towns, offering more frequent connections on weekdays, especially during peak morning hours (5:00 AM - 8:00 AM) and afternoon hours (2:00 PM - 5:00 PM). On weekends, the number of services is reduced, and on Sundays, many lines provide only occasional connections, mostly on main routes.

PKS Konin provides both local and long-distance connections, linking key cities in the region, such as Konin, Slupca, Kolo, Sompolno, Slesin, and Kleczew, with smaller towns. Bus stops located near railway stations allow for convenient transfers to trains. PKS Konin services are more accessible on weekdays, while on weekends, the number of routes is significantly reduced, posing a challenge for residents of smaller towns, especially outside of peak hours.

Accessibility of PT vehicles and stop infrastructure

The accessibility of vehicles and stop infrastructure is a key element in ensuring mobility and social integration for the elderly. As societies age, an increasing number of older adults face barriers that hinder or prevent them from using public transportation. For this group, solutions that ensure easy boarding and alighting, safe movement around stops, and access to schedule information are of particular importance.

Accessibility of transportation for the elderly

Since the 1990s, Poland has been modernizing or replacing its vehicle fleet to accommodate people with limited mobility. The process of bus replacement accelerated after Poland's accession to the European Union in 2004. After 2004, companies providing public transport services gained access to funding from numerous EU operational programs, which further sped up these changes. However, the improvement of vehicle accessibility for people with limited mobility progresses at a different pace for each type of public transport

Accessibility of public transport vehicles

The primary legal act regulating the minimum requirements for access by people with limited mobility, including wheelchair users, was Regulation No. 107 of the United Nations Economic Commission for Europe (Official Journal of the EU, 2018.52.1). It defined a passenger with limited mobility as including disabled individuals such as those with reduced sensory and intellectual abilities, wheelchair users, people with mobility impairments, and individuals of short stature. The definition also encompassed people carrying

heavy luggage, the elderly, pregnant women, people with shopping carts, and those with children, including children in strollers.

Based on international regulations, the standardization of the growing market for buses adapted to the needs of people with disabilities took place. The development of modern buses offered by leading European manufacturers progressed in stages and was closely linked to the adaptation of transport infrastructure to social expectations and legal requirements (Raczynska-Bulawa, 2017).



Figure 2: Partially low-floor Jelcz M181MB bus. Buses of this type are being phased out of operation in Poland. (*Phot. M.Bis*)

The first vehicles were characterized by a compromise that took into account technical capabilities and the adaptation of the vehicle to the needs of people with limited mobility. This compromise resulted in vehicles (Fig. 2) where 35% of the vehicle's length had a low-floor design. In the remaining part of the vehicle, the classic layout used in high-floor buses was retained.

The final stage in the evolution of vehicles adapted to the needs of people with limited mobility was the introduction of fully low-floor buses to the market (Fig. 3). The first buses of this type began to be offered by leading manufacturers in the first half of the first decade of the 21st century.



Figure 3: Low-floor Solaris Urbino 12 bus. Buses of this type are now the standard across Europe. (*phot. M.Bis*)

In addition to the low-floor design, some solutions have been implemented to improve the comfort and accessibility of the bus for all passengers, especially for people with disabilities and parents with small children, namely:

- a) low floor throughout the entire length of the bus. Unlike vehicles where the low floor is only present in the front or middle section, buses with a fully low-floor design make it easier to move around inside. This eliminates the need for passengers to climb steps, which is important for elderly individuals, wheelchair users, and parents with strollers.
- b) wide doors, including at least one pair of increased width. Wider doors allow for more comfortable boarding and alighting, especially for people using wheelchairs or walking aids. Wider doors also minimize the risk of congestion when a larger number of passengers are boarding, which speeds up the passenger exchange process at stops.
- c) The bus kneeling system allows one side of the bus to be lowered so that its floor is closer to the level of the curb. This is an important convenience, enabling easy boarding without the need to overcome a significant height difference, which greatly enhances accessibility for the elderly and disabled.
- d) designated areas for people with limited mobility, spaces for mothers with children, and spots for wheelchairs. These appropriately marked areas are often equipped with additional seat belts and fastening systems to ensure stability and comfort during the ride. Additionally, the space for strollers and wheelchairs is designed to be easily

accessible and safe, while the seats for the elderly are located near the doors.

- e) ramp enabling wheelchair users to board. Low-floor buses are equipped with ramps, which can be either manual or automatic. These ramps allow wheelchair users to enter the vehicle independently or with minimal assistance. This is a crucial solution that significantly enhances the independence of people with disabilities.
- f) Adapted handrails and grips. Specially designed handrails and grips in buses are ergonomic and placed at various heights, allowing for comfortable use by both seated and standing passengers. In vehicles for people with limited mobility, there are often additional handrails near the seats to assist with standing up and maintaining stability during the ride.
- g) A sufficiently loud and clear passenger information system. Modern buses are equipped with audio and visual systems that inform passengers about stops, the direction of travel, and other important announcements. For visually impaired individuals, it is crucial that the messages are clear and loud enough, while for hearing-impaired passengers, they should be displayed on high-resolution, easy-to-read screens.

All of these elements together create a modern, accessible, and user-friendly means of transport that meets the needs of a wide range of passengers, regardless of their mobility or sensory limitations. Achieving a complete renewal of the vehicle fleet took two decades. In recent years, nearly 100% accessibility of low-floor vehicles has been reached across all urban transport systems in Poland.

The scale of the modernization process in urban transport is illustrated by the fleet renewal process in the Warsaw metropolitan area, which is characterized by significant economic potential, favorable conditions for the development of urban transport, and a focus on the growth of public transportation.

The Warsaw metropolitan area, home to 3.5 million people, has a public transport system that serves numerous urban and suburban bus lines. Such an extensive system requires a large fleet of buses and an organizer to coordinate the operations of all components of the public transport system. In the metropolitan area, the complete transition to low-floor buses took 16 years. The program began in 1997, when low-floor buses made up only 2.1% of the fleet (Zarząd Transportu Miejskiego, 2012). By 2006, low-floor buses accounted for half of the fleet (49.9%), and by 2010, this figure had risen to 84.7%. The full transition to a low-floor fleet was completed at the end of 2013 (UM st. Warszawy, 2013).

Share of low-floor vehicles in MZK Konin

MZK Konin, like other cities, has undergone a gradual fleet renewal process. Initially, the replacement of the fleet was supported by the purchase of used low-floor buses from Germany, followed by the acquisition of brand-new buses. Currently, MZK Konin operates a fleet consisting exclusively of high-standard low-floor buses.

Share of vehicles adapted for transporting people with limited mobility in PKS Konin

In the case of the PKS Konin fleet, the situation is dramatically different compared to MZK Konin for several key reasons. Most of the vehicles owned by PKS Konin are high-floor buses, which are not adapted for transporting people with limited mobility. Due to their design, these vehicles make it difficult for passengers using wheelchairs or those with mobility issues to access the interior.

Additionally, in the context of long-distance transport, new vehicles adapted for transporting people with limited mobility are only beginning to be introduced to the market. This means that the modernization of PKS Konin's fleet to meet current accessibility standards is an ongoing process that will require time and significant financial investment.

Agglomeration connections, in which PKS Konin operates, have their own specific characteristics. In the past, due to the diversity and variability of demand, insufficient attention was paid to adapting vehicles to the needs of people with limited mobility. This oversight resulted from long-term neglect and the lack of appropriate regulations in the past. Therefore, introducing changes to improve accessibility requires PKS Konin to adapt to new standards, which involves the need to replace part of the fleet and retrofit existing vehicles.

In summary, PKS Konin faces the challenge of modernizing its vehicle fleet to ensure better accessibility for people with limited mobility. This is driven by both current market standards and the long-term neglect in adapting vehicles to the needs of this passenger group. Addressing these issues will require the replacement of part of the fleet and the adaptation of existing vehicles to meet new accessibility requirements.

Accessibility of Stops Infrastructure

A bus or train stop is a key component of transport infrastructure. Improving the physical accessibility of vehicles and stop infrastructure not only enhances the comfort of using public transport but also contributes to the increased independence of elderly people, supporting their social activity and reducing the risk of social isolation. Challenges such as long distances to stops, uneven pavement surfaces, steep ramps, and the lack of appropriate ramps

(Fig. 4) can significantly limit the mobility of elderly people (Dong & Jianqiang, 2021).



Figure 4: Examples of train stop infrastructure (stairs) and information not adapted to seniors needs. (phot. M.Bis)

Replacing the fleet with low-floor vehicles alone will not solve the issues of accessibility in public transport unless bus stops and pedestrian infrastructure are also modernized. While low-floor vehicles can greatly facilitate boarding and alighting, their full potential may be wasted if the stops are not adequately adapted. Therefore, it is crucial to focus on adapting bus stops to the needs of the elderly, utilizing a range of solutions that can improve accessibility for older individuals. These solutions might include the installation of ramps, even surfaces, seating areas, and clearly visible signage, all aimed at making public transport more user-friendly for seniors and individuals with limited mobility.

It can be stated that the condition of bus stops in large cities is generally good, with the required standards being met and most stops in satisfactory condition (Najwyższa Izba Kontroli, 2020). However, the situation is drastically different in rural and suburban areas. Bus stops are often limited to a pole with a D-15¹ sign, lacking shelters or other amenities. Accessing these

¹ Sign D-15, according to the Regulation of the Ministers of Infrastructure and Internal Affairs and Administration of July 31, 2002, regarding road signs and signals (Journal of Laws 2019.2310), designates, in accordance with Article 51, point 1, 'bus stop.' According to Article 51, point 2, Sign D-15 also indicates a stopping place for vehicles other than buses that are

stops typically involves walking along narrow, unlit shoulders. For elderly people, using such stop infrastructure becomes not only difficult but also dangerous, especially in adverse weather conditions or at night.

In some places, bus shelters do exist, but they are in poor technical condition. There is a lack of clear and well-maintained timetables (Fig. 5), which is especially important for elderly individuals who may be digitally excluded and rely on the physical timetable at the stop as their only source of schedule information. Inadequate or missing information makes it difficult for older passengers to plan their journeys, contributing to their exclusion from public transport services.

An extreme example is the square on Okulickiego Street in Stalowa Wola, from which buses and minibuses depart², where there is no infrastructure for passenger service. The schedules have been haphazardly hung on street lighting, making it difficult to obtain clear information about departures.



Figure 5: The bus station for minibuses built on the site of a parking lot managed by PZM ³, located opposite the PKS bus station in Stalowa Wola. Apart from unclear schedules, this station had no infrastructure for serving passengers. (phot. M.Bis)

engaged in paid transport of persons on regular routes and for vehicles intended for transporting children to schools and kindergartens.

² A minibus is a colloquial term for vehicles designed to transport no more than 17 people (including the driver) and with a length not exceeding 8 meters. Private carriers operating such vehicles provide local as well as long-distance connections.

³ PZM is the abbreviation for the Polish Motor Association.

It is worth noting that the creation of this so-called bus station was a response to the lack of agreement between PKS Stalowa Wola and private carriers. This station was located directly opposite the PKS bus station, which had all the necessary infrastructure for serving passengers using bus transport. This situation arose from the decision of the PKS Stalowa Wola authorities, who were not interested in cooperating with private carriers, driven by the need to maintain a monopoly on local and long-distance connections. In this context, the PKS management did not adhere to the market principle of “if you can’t beat them, join them”, which resulted in the loss of potential revenue from station fees. These funds could have been used for the modernization of the facility, contributing to an improvement in the standard of passenger service.

Furthermore, the attractively located land of the bus station was sold to a private investor, who committed to implementing a project for the construction of a shopping mall connected to the bus station. However, despite the passage of time, this investment has not been realized, leading to stagnation in the transportation development of the Stalowa Wola district. As a result, PKS Stalowa Wola not only lost the opportunity for a stable source of income but also significantly limited its offer of connections, negatively affecting the availability of transport services for residents.

A very important aspect is the sense of safety, and according to research conducted in Vienna, cited by Professor Bartosz Czarniecki, the following places were deemed unsafe, conducive to threats, and causing stress: public transport stops (29%), underground passages (23%), public garages (21%), green areas and parks (18%), as well as building entrances and staircases (9%). At the same time, a list of places particularly avoided, especially by women as part of a defensive strategy, was developed: public transport stops (29%), parks and green areas (24%), specific streets and squares (17%), alcohol-serving establishments (10%), underground passages (8%), other places (7%), and narrow, poorly lit streets (6%). These results confirm earlier analyses regarding areas with a high concentration of crime, which arise mainly due to the concentration of attractive criminal targets and insufficient protection conditions.

It is also worth emphasizing that using unlit and inadequately adapted stops for the needs of elderly individuals can further amplify the sense of danger associated with using public transport (Ciechanski, 2023). These concerns are fully justified, as elderly individuals are more susceptible to becoming victims of crimes, which further amplifies their fear of being in such places. This highlights the importance of adapting urban infrastructure to the needs of all users, especially those who are more at risk.

Availability of Stop Infrastructure in Konin

In the Konin agglomeration, stop infrastructure has posed a challenge in recent years, both in terms of availability and the quality of amenities offered to passengers. In the past, a large number of stops were equipped only with signposts, which limited the comfort of using public transport, especially in unfavorable weather conditions. The situation in 2015 indicated that only a small number of the stops had shelters. The local initiatives related to dynamic passenger information covered a small number of locations, mainly in the city center (City Hall of Konin, 2010).

In recent years, there has been an improvement in the availability of stops, particularly with the implementation of electronic information boards at key points in the city, which enhances the convenience of using public transport. Nevertheless, the limited number of stops adapted for low-floor vehicles remains a problem, particularly affecting individuals with reduced mobility, including the elderly and disabled (City Hall of Konin, 2010). By the end of 2022, the level of actual fulfillment of urban space accessibility requirements still remained low. Only 17% of pedestrian crossings fully met the standards, while as many as 44% did not meet any requirements at all. In the case of MZK stops, none met accessibility standards, which posed a significant challenge, considering that 69% were completely unsuitable. Similar issues were noted for parking lots, where only 40% met the appropriate standards (City Council of Konin, 2022).

Availability of Stop Infrastructure for Urban Transport

A clear improvement in accessibility was achieved following the renovation of the PKP station in Konin, which was redesigned with consideration for individuals with limited mobility. Despite the significant modernization of the PKP station in Konin, which greatly enhanced its accessibility, it is worth noting the lack of integration with bus transport, which was originally planned as part of the 'Integrated Commercial and Service Center Dekada.' The cancellation of the construction of a bus station in close proximity to the train station, despite earlier plans, limits the potential benefits of fully integrating different modes of transport. The change in concept, resulting from a cost and needs analysis, means that functions related to servicing bus passengers will be limited to two ticket counters at the train station, rather than creating an integrated transport space.

In the agglomeration, local bus stations operate in Sompolno, Kolo, and Slupca. In Sompolno, the bus station building has been connected to the local police station. As a result, passengers have access to a waiting area and a restroom that is not adapted for the needs of disabled individuals. There are two platforms that require overcoming a high curb to access. The

infrastructure is in good condition but needs improvement to better accommodate the needs of disabled individuals.

The bus station in Kolo receives many negative reviews. In reality, it is not a traditional station but rather a few stops scattered around the Netto store. Residents and travelers complain about the lack of clear information regarding where individual buses depart. The stops are spread across several different locations, which further complicates navigation. Additionally, not all buses stop at this location, departing instead from another less obvious place known mainly to local residents.

The second location from which buses depart is a stop situated near the renovated PKP station in Kolo. This location provides a well-maintained waiting area and infrastructure adapted for passengers with limited mobility. It allows for a smooth and comfortable transfer from the train to the PKS bus.

The third-largest bus station in Slupca is equipped with bus shelters; however, they do not provide effective protection from the rain. Passenger service is conducted from a central platform, access to which is hindered by a high curb, posing a challenge particularly for individuals with limited mobility.

Concluding, the stop infrastructure in the Konin agglomeration is far to the desired one, particularly in terms of accessibility and comfort for passengers. Although some amenities, such as electronic information boards in key locations, have been implemented, many stops still do not meet accessibility standards. This is especially true for bus stops, where only a portion is adapted for low-floor vehicles, impacting individuals with limited mobility.

The modernization of the PKP station in Konin has significantly improved the accessibility of this facility; however, the lack of integration with bus transport limits the potential benefits of fully integrating different modes of transport. The construction of a bus station as part of the 'Integrated Commercial and Service Center Dekada' was abandoned, which changed the original assumptions regarding transport integration in the city.

Local bus stations in Sompolno, Kolo, and Slupca also face challenges. In Sompolno, the stops require adaptation to the needs of disabled individuals, and the high curb poses a barrier. In Kolo, there is no central station and the stops are dispersed, causing confusion among travelers. In Slupca, despite the presence of bus shelters, they do not effectively protect against weather conditions, and access to the platform is hindered by a high curb.

In summary, despite some progress, the stop infrastructure in the Konin agglomeration still requires improvement, especially in terms of adapting it to the needs of all users, including individuals with limited mobility. The proposed directions of action aim not only to improve the accessibility of the stops but also to enhance the comfort of using public transport in the Konin

agglomeration, which is crucial in the context of sustainable transport development and the growing needs of residents.

Accessibility of Public Transportation. Challenged and Improvement Proposals for the Elderly

In the article, the authors discussed the key issues related to the accessibility of public transportation for the elderly in suburban areas of Poland. The biggest challenge faced by seniors is the limited number of connections or their complete absence in rural areas. Investments in modern stop infrastructure, road system or passenger information system may prove ineffective if they are not utilized by local communities and both public and private transport operators.

To make investments effective, local governments should consider the gradual introduction of a demand-responsive transport system and support grassroots initiatives organizing rides to larger urban centers. The solutions being tested in the Czech Republic can serve as good examples, where subsidized connections often run with a minimal number of passengers. These connections are replaced by a service in which passengers can order transport by phone or directly from the driver of another line (Janous, 2011).

The “Connections on call” system implemented in the Milevsko microregion in the Czech Republic is an example of such a solution. This model is based on a flexible approach to running connections, meaning that vehicles operate only after passengers have requested a ride in advance. Reservations can be made by phone or directly with the driver, allowing for efficient route planning and minimizing operational costs. The implemented EM 126i MIJOLA system provides advanced features, such as real-time route monitoring and cashless payment options, which significantly enhance passenger comfort (DISPATCHING SYSTEM with reservation for On-Call Connections, 2011) (Hanzlík, 2011).

The implementation of such a system demonstrates that demand-responsive transport can be an effective alternative to connections operated with fixed schedules, especially in rural areas. Thanks to its flexibility and the ability to adapt services to the current needs of residents, connections on call increase the availability of transport services in regions with low population density, while simultaneously optimizing resource utilization (Cerna, 2024). Such services could provide flexibility and better access to transportation, especially in areas with fewer connections.

To ensure full accessibility of public transportation, a series of actions must be taken both at the infrastructure level and in the organization of transport services. The introduction of effective remedial measures requires an integrated approach that considers the needs of various user groups, particularly the elderly and those with limited mobility. Below are proposed

actions that could significantly improve public transport accessibility. In the Konin agglomeration, improving accessibility should be implemented through:

- Continuing the modernization of the stop infrastructure. Bus stops should be equipped with shelters to provide protection from the weather and proper lighting to enhance safety. It is also essential to ensure smooth surfaces and accessible ramps, allowing easy access to the stop. In high-traffic areas, the installation of electronic information boards and audio-visual systems should be considered, tailored to the needs of people with visual and hearing impairments.
- modernizing local stations in Sompolno and Slupca by adapting platforms to meet the needs of people with disabilities. It would be worth considering ordering a portable lift designed for the front entrance of buses.
- clearly designating the location of the bus station in Kolo. Moving the bus station functions to the PKP train station building to create a modern transit hub.
- Increasing the accessibility of bus stops in rural and peripheral areas. In regions with low population density, it is essential to provide basic stop infrastructure. Efforts should be made to eliminate situations where stops are merely poles with signage, without shelters or proper access paths. It is also crucial to ensure lighting and safe routes to bus stops, especially in locations far from main roads. At the bus shelter, there should be a module with a phone and a button to connect to a dispatcher, allowing passengers to request a bus on demand, along with an SOS button for emergency calls to 112.
- Creating a network of on-demand connections using the fleet of MZK Konin, PKS Konin, and local taxi companies. These connections would be carried out based on a contract that includes framework transport routes, per-kilometer rates, and the time for connection fulfillment from the moment of request. The fleet for these services would consist of minibuses (including electric ones) adapted for transporting people with disabilities.

Summing up, a comprehensive improvement in public transport accessibility requires coordinated actions that involve both the modernization of infrastructure and the better organization of transport services. Investments in these areas will contribute to greater independence and mobility for the elderly, which will, in turn, improve the quality of life and social integration throughout.

Conclusions

The study highlights significant challenges in the accessibility of public transport for older people in Poland's rural and peri-urban areas, emphasizing the detrimental effects of transport exclusion. The reduction in bus lines and passenger numbers, which declined by 42% and 61.3% respectively between 2014 and 2021, demonstrates a "vicious cycle" in public transport, where decreased demand leads to further cuts in services. This issue disproportionately affects seniors, limiting their ability to access essential services, such as healthcare and shopping, and participate in social life, ultimately contributing to isolation and a loss of independence.

Urban centers, like Konin, have made progress in modernizing their public transport infrastructure with low-floor buses and electronic information systems. However, this is not the case in peripheral towns, where inadequate infrastructure, such as unlit stops, high curbs, and a lack of shelters, remains a pressing issue. Only 17% of pedestrian crossings in the Konin region meet accessibility standards, and 69% of bus stops are unsuitable for individuals with limited mobility. These disparities highlight the need for comprehensive modernization efforts.

To address the main challenges, the implementation of demand-responsive transport (DRT) systems, similar to the "Connections on Call" model in the Czech Republic, presents a promising solution. Such systems allow passengers to request transport on demand, optimizing service delivery in low-density areas while reducing operational costs. Furthermore, investments in modernizing stop infrastructure, such as installing shelters, ramps and lighting, would significantly enhance accessibility and safety for seniors. Integrating transit hubs, such as relocating bus functions to train stations, could also streamline connections between various modes of transport.

Improving the accessibility of public transport for older people is not only a matter of enhancing mobility but also of fostering social inclusion and sustainability. By reducing reliance on private vehicles and promoting equitable access to transport, these measures contribute to broader societal and environmental goals. The findings show the urgency of systemic, integrated strategies to address transport exclusion. Collaboration between local governments, transport operators, and private entities will be critical to achieving meaningful improvements. Future research and pilot programs for demand-responsive systems and infrastructure upgrades should be prioritized to ensure that public transport serves the needs of all demographic groups, particularly the elderly.

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