

Evolution and challenges of sustainable public transport in medium-sized cities

Leszek Szczupak * , Izabela Rącka ** , Olga Buzu *** 

* *Institute of Management and Quality Sciences, University of Kalisz,
ul. Nowy Świat 4, 62-800 Kalisz, Poland
l.szczupak@uniwersytetkaliski.edu.pl*

** *Institute of Social Sciences, University of Kalisz,
ul. Nowy Świat 4, 62-800 Kalisz, Poland
i.racka@uniwersytetkaliski.edu.pl*

*** *Department of Economics and Management, Technical University of Moldova,
168, Stefan cel Mare bd., Chisinau, Republic of Moldova
olga.buzu@emi.utm.md*



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Abstract: Public transport in medium-sized cities is crucial for ensuring the mobility of their inhabitants despite lower resources and population density. These cities struggle with increasing communication demands due to suburbanisation and changing demographics. Public transport must connect urban and suburban areas, providing access to services and jobs. The challenge is the decline in passenger numbers, partly due to the increasing popularity of individual transport. The paper aims to identify the conditions for the development of public transport in medium-sized cities in Poland and the conditions and challenges for its sustainable development. The research method used was a case study based on the example of Kalisz, a medium-sized Polish city in Greater Poland. As a result of the research conducted, the situation in the city was diagnosed, including a decline in the number of public transport passengers, and the actions taken and planned by the local government were analysed, such as the introduction of free public transport for residents, the modernisation of the bus fleet, including the purchase of electric vehicles, the integration of public transport with suburban areas.

Keywords: public transport, sustainable development, electromobility, transport system, suburbanization

Sustainable Development Goals (SDGs): **SDG 11:** Sustainable Cities and Communities; **SDG 13:** Climate Action; **SDG 9:** Industry, Innovation and Infrastructure; **SDG 3:** Good Health and Well-being; **SDG 10:** Reduced Inequalities

1. Introduction

Public transport is one of the key elements of urban infrastructure that significantly impacts citizens' quality of life and the functioning of cities. Adequate quality of public transport is one of the key conditions for ensuring the availability of all other public services. In medium-sized cities, which form a bridge between small towns and large urban agglomerations, the challenge is to provide an efficient, universally accessible and sustainable transport system. The specificity of the spatial structure of medium-sized cities is most often due to their rich history and urban heritage. On the one hand, these cities have to meet the transport needs of their inhabitants within the city limits, providing efficient connections between key districts and settlements; on the other hand, they play an essential role as a regional centre, integrating with surrounding towns and larger centres – metropolises.

Much of the literature is devoted to analysing metropolises and megacities, but cities of other sizes are too often overlooked. Focusing on medium-sized cities, home to at least a quarter of the world's population, will make cities more sustainable. Medium-sized cities are flexible in terms of urban expansion, the introduction of green transport and environmental protection, but unfortunately, they have fewer resources to implement new transport modes and may be more vulnerable to fluctuations in the global economy (Pojani & Stead, 2015).

An additional challenge for public transport in a medium-sized city is the need to modernise and adapt the infrastructure to modern ecological and social requirements.

In the face of increasing urbanisation, the changing needs of residents and environmental priorities, it is becoming crucial to develop the transport network to promote sustainable development. An analysis of public transport in medium-sized cities is essential for the development of coherent and forward-looking transport policies that will not only improve residents' quality of life, but also strengthen the position of such cities in the region.

The paper is structured under five sections. After this, section 2 focuses on the literature review, section 3 presents the research methods, section 4 contains the results, section 5 discusses the results, and concludes the paper.

2. Literature review

Over the years, transport systems in medium-sized cities have undergone significant changes. Traditional modes such as buses (less often trams) were characterised by simple infrastructure and limited flexibility, often leading to problems of punctuality and availability of services. The growth of medium-sized cities, especially suburbanisation, has created the need to provide transport options in expanding areas with increasingly low population densities. This is associated with both increased costs and environmental pollution. In addition, traditional modes of transport have been partially replaced by individual transport (cars). To avoid unsustainable, dispersed growth patterns, decisive measures should be taken to reduce car use in medium-sized cities (Calonge-Reillo, 2023). However, modern urban planners have not yet found a satisfactory solution to reduce the adverse effects of private transport without unduly restricting the natural need for mobility. Bus transport does not seem to be an attractive alternative to cars. In medium-sized cities, buses are usually not separated from road traffic (Kolos & Taczanowski, 2016). A noticeable trend in the development of urban transport is the development of bicycle policy: increasing alternative forms of mobility in transport by increasing the availability of city bikes (Kwiatkowski, 2021) and building pedestrian and bicycle paths (Sousa et al., 2019; Dziecielski et al., 2024). In addition, local authorities are deciding on implementing low-emission zones, which involve restrictions on access, movement and parking of vehicles (Harms et al., 2016; Jiménez-Espada et al., 2023).

Recently, there has been a search for modern solutions using information and communication technologies to increase the efficiency and availability of transport services. One possible solution is Mobility on Demand, which is based on a traffic scenario that responds to the current demand for transport, including city or regional maps, existing public transport timetables, standardised traffic light switching patterns, etc. In the case of such solutions, it is crucial to use and regularly update current mobility data (Spengler et al., 2023). Increasing attention is being paid to the presence of different external groups of people using transport in the city. These include residents of neighbouring areas and tourists, who generate additional traffic to destinations that are often different from those of the local

population. Therefore, the multidimensionality of urban mobility decisions is important (Miravet et al., 2021). Autonomous vehicles can also affect urban transport demand, facilitating urban growth (Meyer et al., 2017). The introduction of intelligent transport systems (ITS) allows for better traffic management, route optimisation and improved communication with passengers.

In medium-sized cities, public transport plays a key role in ensuring the mobility of residents, reducing traffic congestion and minimising negative environmental impacts (Logan et al., 2020). An efficient public transport system improves the quality of life, supports economic development and promotes the sustainable development of urban areas. Sustainable public transport meets the mobility needs of today without compromising those of future generations, minimising negative environmental, social and economic impacts. It contributes to reducing air pollution and noise, improving public health and increasing the availability of jobs and services (Taczanowski et al., 2018). Economically, an efficient transport system supports local economic development and attracts investment. Key strategies for sustainable transport include integrating different transport modes, promoting shared mobility, investing in walking and cycling infrastructure, and implementing policies that reduce private car use in favour of public transport. The most significant potential for sustainable changes in transport lies in user interest in public transport (Silva et al., 2023; Wimbadi et al., 2021). The current challenge to sustainable mobility is the development of low- and zero-emission urban public transport. Unfortunately, in the context of sustainable development in medium-sized cities, zero- or low-emission buses are not as common as in large, economically stable cities. A proactive development policy for medium-sized cities aimed at improving the quality of life of their inhabitants is critical, especially in a situation where depopulation is taking place. Electric vehicles can be a tool to maintain or even increase the importance of the role and status of medium-sized cities (Guzik et al., 2021).

3. Research method

The research aimed to identify the conditions for the development of public transport in medium-sized cities in Poland and the conditions and challenges for its sustainable development. The research method used was a case study, consisting of an in-depth and multi-aspect analysis of a single case, a person, group, organisation, event, process or phenomenon. This method is widely used in the social sciences. The case study is a valuable research method with many advantages: it is characterised by a holistic research approach and is used to analyse the context and the factors influencing the case under study. It is a flexible method that combines different research techniques: interviews, observations, document analysis, and surveys (Yin, 2018). The detail of this method allows for a deep understanding of complex phenomena rather than making generalisations. Another advantage of the case study is realism, i.e., conducting the study in a real context, without artificial control of variables. This allows the social, cultural and organisational context to be considered. Both inductive and deductive approaches can be used to conduct research – a case study can be used both to generate theory (Eisenhardt, 1989) and to test existing hypotheses (Yin, 2018).

Despite criticisms (e.g., allegations of lack of generalisability, subjectivity in data interpretation, and time-consuming research process), case study is a well-established research method, especially in the social sciences and humanities, where context plays a key role. Among the philosophical foundations of a case study are the works of Schutz (1962) and Guba & Lincoln (1994), which assume that reality is subjective and contextual (interpretive paradigm). In addition, in key publications on case studies, one can find assumptions of critical realism, which is an approach that assumes that reality exists independently of our cognition but can be studied through contextual analysis of cases (Bhaskar, 1978). The importance and usefulness of this research method is widely emphasised in the literature. Yin (2018) emphasises the importance of a systematic approach to case studies, demonstrating the need for multi-source data analysis and triangulation. He divides the case study into exploratory, descriptive and explanatory, emphasising the research strategy. Stake (1995) presents a qualitative approach to a case study, emphasising its value in interpreting reality and understanding unique contexts. Flyvbjerg (2006) refutes the criticism of case study as a method, arguing that it can provide valuable theoretical insights and that only individual cases can lead to broad generalisations.

The study was based on an exemplary medium-sized city, the second largest city in Greater Poland - Kalisz province. In addition, to compare the state of sustainable transport diagnosed in this city, it was compared with data from other medium-sized cities in Poland, similar in size and socio-economic

parameters. These cities include Kołobrzeg, Koszalin, Ostrowiec Świętokrzyski, Siedlce, Słupsk, Toruń, Zamość, as well as larger cities: Bydgoszcz, Rzeszów.

Kalisz, with a population of almost 100,000, is an example of a medium-sized urban centre that, although smaller than a metropolis, must meet the growing mobility needs of its inhabitants and provide an effective and sustainable communications system. The challenges arise from a lower population density than in large cities, limited financial resources and the need to integrate different modes of transport. Due to its strategic location and role as a regional communication hub, it has the potential to become an example of a medium-sized city that effectively combines traditional transport solutions with modern technologies while ensuring the accessibility, efficiency and environmental friendliness of the transport system.

The following documents were analysed in order to diagnose public transport in Kalisz:

- Strategy for the Development of Kalisz for 2014-2024 (Kalisz City, 2014),
- Periodic Report on the Implementation of the Kalisz City Development Strategy for 2014-2024 for 2020 Macroeconomic Analysis (Kalisz City, 2020),
- Sustainable Public Transport Development Plan for Kalisz City PTC, (2021).

4. Results

4.1. The challenges of public transport in medium-sized cities - the example of the city of Kalisz

Public transport in medium-sized cities such as Kalisz faces many challenges due to dynamic social, economic, and environmental changes. In recent years, Kalisz, like many other cities of similar size in Poland, has experienced a decline in the number of passengers using public transport. Reasons for this trend include the growing popularity of individual transport, primarily cars, and the migration of young residents to larger urban centres. In addition, demographic changes, such as an ageing population, are reducing the demand for public transport services. Between 2013 and 2023, the number of inhabitants of Kalisz will decrease from 103,997 in 2013 to 93,973 in 2023. The age structure of Kalisz's population shows that 56.5% are of working age, 16.4% are of pre-working age, and 27.1% are of post-working age (Statistics Poland, 2024). In order to counteract the decline in passenger numbers, the Kalisz authorities introduced free public transport from 1 January 2023. After several months of operation, passengers increased by tens of per cent. Similar challenges related to declining public transport ridership can be observed in other medium-sized cities in Poland.

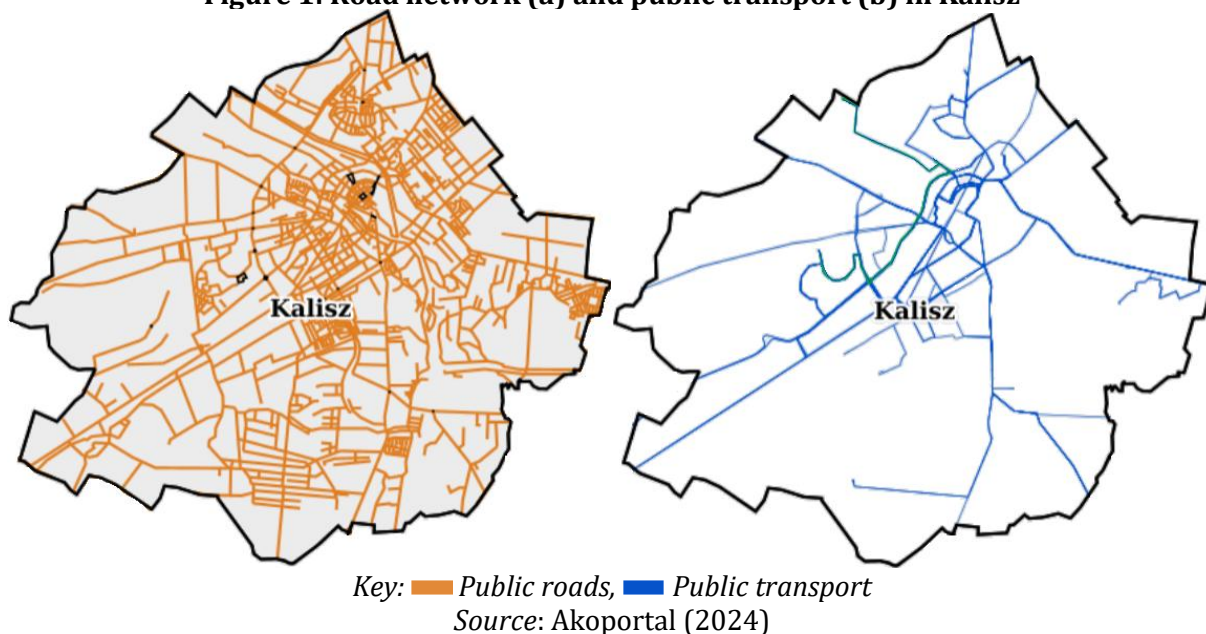
For example, in cities in Central Pomerania such as Koszalin, Słupsk or Kołobrzeg, the availability of public transport plays a key role in combating transport exclusion, especially in areas with dispersed development and lower population density. Koszalin, an important regional centre, faces the challenge of encouraging residents to use public transport. In response, measures have been taken to improve bus stop infrastructure and modernise rolling stock, including purchasing environmentally friendly electric buses. In addition, the city is developing real-time passenger information systems to increase the convenience and availability of transport services. Like Kalisz, Słupsk has experienced a decline in passenger numbers, mainly due to the migration of young people to larger cities and the popularity of private transport. To counteract this, the city has introduced an integrated agglomeration ticket, allowing residents to use public transport in Słupsk and neighbouring municipalities. This makes it easier for residents to travel between home, work, or school. In Kołobrzeg, where the number of public transport users increases significantly during the tourist season, the challenge is adapting the service to passengers' changing needs at different times of the year. The city has invested in developing bus lines, especially those serving the coastal areas, and has introduced free public transport for children and young people. These activities aim to increase public transport interest among residents and tourists. Similar to Kalisz, the cities of Central Pomerania must develop a transport policy that responds to the local needs of residents and, at the same time, contributes to sustainable development (Gajda et al., 2023).

These examples show that investing in environmental solutions, improving regional integration and adapting services to the specific needs of residents can bring tangible results in counteracting the decline in passenger numbers. Introducing free public transport in Kalisz can be an example for other medium-sized cities looking for practical solutions to increase passenger numbers and promote

sustainable urban transport. The high cost of maintaining public transport is one of the key challenges in medium-sized cities. The maintenance of the infrastructure, the modernisation of the fleet and the costs of ongoing operations absorb a significant part of the city budget. The profitability of passenger transport decreases as the number of passengers decreases, forcing cities to subsidise public transport from public funds increasingly. In Kalisz, it was decided to introduce free public transport in 2023 to counteract the decline in passenger numbers and promote public transport as an alternative to private transport. Although these measures have resulted in an increase in the number of passengers by several tens of per cent, they have also significantly increased the operating costs borne by the city budget, which is struggling to cover the difference between the cost of running the system and the lack of revenue from tickets.

Another example is the bus fleet's modernisation – Kalisz has recently purchased modern buses, including hybrid and electric vehicles. Although green vehicles help to reduce emissions and improve air quality, their high purchase and maintenance costs require support from EU and national funds. Without such funding, the development of public transport in Kalisz would be severely hampered. In cities such as Ostrowiec Świętokrzyski or Zamość, where the cost of operating public transport is also a significant burden on the city budget, other solutions have been implemented. In Zamość, for example, restrictions on the number of trips during off-peak hours were introduced to reduce operating costs. However, such measures were met with dissatisfaction from residents, who found it more difficult to access transport services. In Siedlce, similar to Kalisz, the focus was on modernising the fleet with the help of European funds. Siedlce bought electric buses and installed a fleet management system, which increased efficiency, but the investment costs required long-term financial commitments. Like Kalisz, other medium-sized cities are seeking a balance between the cost of running public transport and ensuring the availability of services to residents. Many of them are trying to attract external funding and optimise the transport system by introducing intelligent management systems, limiting the number of less profitable trips, or integrating urban and regional transport. However, without stable funding and a long-term transport strategy, the challenges associated with high maintenance costs can hamper the development of public transport in such cities. Modernising the public transport fleet is one of the key challenges facing medium-sized cities in Poland. In Kalisz, as in many other urban centres, replacing outdated rolling stock with modern, low-emission vehicles is becoming a priority in the context of environmental requirements, improving the quality of transport services and reducing operating costs. Another challenge is the availability of public transport, which is unsatisfactory - Kalisz's road system and public transport routes are shown in Fig. 1.

Figure 1: Road network (a) and public transport (b) in Kalisz



The reason for the replacement of the bus fleet in Kalisz is the need for:

- Increased energy efficiency – older vehicles are more prone to breakdowns and energy consumption despite regular repairs. They cost more to maintain and consume more fuel, putting a strain on city budgets;
- Reducing CO₂ emissions – national and EU regulations (e.g., The European Green Deal) require cities to reduce greenhouse gas emissions. Public transport plays a key role in the transition to low emission technologies. Improved passenger comfort - modern electric buses provide a quieter and more comfortable ride, which can encourage more people to use public transport (European Commission, 2021);
- Meeting accessibility standards – old vehicles are often not adapted to the needs of people with disabilities or parents with prams. The new low-floor fleet will provide better accessibility for all passengers.

In 2025-2026, Kalisz plans to purchase 19 modern low-floor articulated electric buses and build the necessary infrastructure, including charging stations. The value of the investment is estimated at tens of millions of zlotys. The aim is not only to reduce CO₂ and noise emissions but also to improve the efficiency of the city's transport system. The city plans to cover the project's costs with EU funds - it will receive money from the European Fund for Infrastructure, Climate and Environment programme, which supports projects related to the greening of cities. Also, funds can be obtained from the National Fund for Environmental Protection and Water Management from programmes supporting electric mobility. The local budget will cover Part of the costs, which requires proper budgeting. Kalisz is also considering cooperation with private investors in order to minimise the burden on the budget. Examples of similar activities can be found in other cities of similar size in Poland. Kielce, for example, invested in 20 electric buses and chargers in 2022, financed by EU funds. The city has reduced CO₂ emissions by more than 30% thanks to the new fleet.

Meanwhile, Zielona Góra was one of the first cities in Poland to implement a comprehensive electric transport system with a fleet of 64 electric buses. Tarnów, for example, replaced part of its fleet with hybrid buses and invested in modernising its bus depot and fleet management systems. This reduced operating costs and improved passenger comfort.

The modernisation of the vehicle fleet in Kalisz is a step towards the city's sustainable development and improving its inhabitants' quality of life. Based on examples from other cities, this investment shows that the transition to electric mobility in medium-sized cities is not only possible but also necessary in today's environmental and social challenges.

4.2. The suburbanisation of cities and its impact on the integration of transport systems

The city's expansion into the suburbs poses challenges for integrating public transport. Neighbouring municipality residents often do not have convenient access to public transport, which increases their dependence on cars. Bus lines in Kalisz, which serve both the city and neighbouring municipalities, need to be adapted to the changing needs of passengers. Suburbanisation and integration of transport systems are significant challenges for medium-sized cities such as Kalisz. The development of suburban areas and the migration of residents from the city centre to the surrounding areas affect the need to adapt the public transport system to new demographic and spatial realities. The "Development Strategy of the City of Kalisz for 2014-2024" (Kalisz City, 2014) points to the ongoing process of suburbanisation and the emigration of young people to other cities or abroad as the main reasons for the city's depopulation. In 2020, the registration rate was 5.92 persons per 1,000 inhabitants, while the deregistration rate reached 8.86 persons per 1,000, indicating a negative migration balance (Kalisz City, 2020). The urban sprawl brings many challenges related to ensuring adequate access to public transport. The phenomenon of suburbanisation means that more and more people are settling in the municipalities surrounding the city. Residents of these areas often struggle with limited access to public transport, resulting in a greater dependence on individual transport, mainly cars. Bus services to Kalisz's neighbouring municipalities are infrequent, especially in the evenings and at weekends, making it difficult for residents to commute daily to work, school or health facilities. Another difficulty is the lack of fare integration. The current ticketing system does not always allow the use of a single ticket on routes connecting municipalities with Kalisz, which increases travel costs and discourages the use of public

transport. Inadequate availability of public transport leads to increased car traffic on the roads leading to Kalisz, resulting in traffic jams, increased air pollution and limited parking space in the city.

Bus lines serving Kalisz and neighbouring municipalities must consider the needs of passengers, both in terms of routes and frequency of service. In cooperation with local authorities and transport operators, the municipality should consider introducing more inter-municipal services, covering both the main arterial roads and smaller towns that are not currently served by buses. Routes should also be adapted to new development areas and key transfer points in Kalisz, such as railway and bus stations. Another solution to increase the attractiveness of using public transport is undoubtedly the introduction of a common agglomeration ticket, which would allow the use of public transport throughout the area of Kalisz and neighbouring municipalities, thus reducing passenger costs. The development of transfer hubs is essential - constructing Park & Ride car parks in neighbouring municipalities would allow residents to transfer from their cars to public transport conveniently. When introducing changes to public transport, it is important to look at promising practices from other cities. For example, Rzeszów has introduced the Rzeszów City Card system, which allows residents to use a single ticket throughout the agglomeration. In addition, transfer hubs on the city's outskirts have been integrated with bus lines and city bikes. In turn, Toruń and Bydgoszcz introduced a joint Toruń-Bydgoszcz agglomeration ticket, encouraging residents to leave their cars at home and use public transport, thus reducing traffic on the main routes between the cities. In Koszalin, the suburban bus network has been extended, increasing the number of public transport passengers and reducing the number of cars entering the city. Integrating public transport in Kalisz and neighbouring municipalities is crucial for the region's sustainable development. Adjusting bus routes, introducing standard tickets, and developing transfer infrastructure can significantly improve the availability of public transport. Such measures can help to reduce car traffic, improve air quality and increase the attractiveness of public transport for suburban residents. The process of suburbanisation in Kalisz and its surroundings requires a flexible approach to planning and managing the transport network by the city authorities and public transport operators. Adapting the transport offer to the changing needs of residents and cooperation with neighbouring municipalities are key to ensuring a practical and accessible public transport system, which will be a real alternative to private transport.

4.3. Changing needs of passengers and the functioning of public transport

Modern society increasingly values the quality and comfort of travel, which poses new challenges for public transport. Passengers expect punctuality and availability, comfortable travelling conditions, and adaptation of services to the population's diverse needs. In a survey of public transport users in Kalisz, passengers expressed their expectations for improvements (Szczupak, 2024):

- Passenger comfort: today's passenger demands on public transport are increasingly focused on comfort and quality of travel. Comfort encourages people to use public transport instead of private cars. Modern rolling stock is one of the key aspects to improve passenger comfort. Modern vehicles should have air conditioning, low floors and ergonomic seats, significantly improving travelling comfort. Passengers also expect several technological amenities. Among other things, buses should be equipped with Wi-Fi, which will make it possible to use the Internet during the journey, which is particularly important for young people, students and professionals; USB chargers will allow passengers to recharge their mobile phones or other mobile devices. And information screens showing the route, current position on the map and transfer information;
- Cleanliness and aesthetics: introducing a modern fleet should also be accompanied by new standards of vehicle cleanliness. Bus interiors will need to be designed for easy maintenance, improving aesthetics and hygiene, and the operator should also maintain high standards of cleanliness and aesthetics of the rolling stock;
- Quiet engine operation: modern buses to be introduced into the fleet should be characterised by much quieter engine operation than the current ones. This will improve passenger comfort and positively impact city dwellers' quality of life by reducing noise levels in urban areas.

Raising the standard of travel comfort by introducing modern, environmentally friendly buses will undoubtedly contribute to increasing the attractiveness of public transport. By investing in technology

and facilities, the city can attract more passengers and improve residents' quality of life, which is a key objective of public transport activities.

4.4. Accessibility for people with reduced or no mobility

To be truly accessible to all residents, public transport must consider the needs of people with reduced mobility, including the elderly, people with disabilities, parents with small children and cyclists. In Kalisz, for example, around 60% of the bus fleet is currently low-floor, which makes it easier for passengers with reduced mobility to get on and off. These vehicles also have spaces for wheelchairs and prams, grab bars and handrails to help older and disabled people move around the vehicle, and pictograms and signs to indicate places designated for people with reduced mobility. Despite these improvements, there is still a need to fully adapt the fleet – some older vehicles do not comply with accessibility requirements, limiting the opportunities for all social groups to use public transport. Ensuring full accessibility of public transport is important for social inclusion and improving residents' quality of life. People with reduced mobility often face barriers that make it difficult to participate fully in social and professional life. Adapting the fleet and infrastructure not only increases their mobility but also shows that the city is open to the needs of all residents, regardless of their age, health or circumstances. The complete modernisation of the bus fleet and investment in bus stop infrastructure and driver training are necessary steps towards creating a public transport system that is accessible and friendly to all residents. These investments will improve the city's quality of life and increase public transport's competitiveness compared to private transport.

4.5. Punctuality and flexibility - key challenges for modern public transport

The changing needs of the population and the dynamic development of lifestyles, including the popularity of remote working, flexible working hours and different ways of spending leisure time, require the public transport system to adapt to new realities. In Kalisz, as in many other medium-sized cities, punctuality and timetable flexibility are becoming priorities in the planning and organisation of public transport. Punctuality is one of the most important factors influencing people's choice of public transport. Today's challenges, such as traffic congestion on the city's main arteries, changing weather conditions or insufficient synchronisation of traffic lights, make it challenging to meet timetables. In many cities, passengers report delays on key lines, especially during rush hours. To address these problems, the city is implementing bus priority systems at intersections. Automatic control of traffic lights reduces the time buses wait for a green light, speeding up their journey. It is also necessary to introduce better route organisation, for example, by avoiding routes through the city's most congested areas and introducing dedicated bus lanes where possible.

The development of remote working and flexible working hours means that the traditional model based on morning and afternoon peaks is no longer sufficient. More and more residents expect better connections in the evenings and weekends when social, cultural and leisure activities are more intense. To meet these needs, increasing the frequency of services during peak hours and reducing waiting times for buses during the busiest hours are necessary. Another solution is to adapt the bus timetable to changes in lifestyle, such as:

- More evening services, especially on routes connecting shopping centres, cinemas and other leisure facilities;
- Night services – introducing or increasing the frequency of night bus services to enable people to return home after hours;
- Regular weekend services - reducing the difference in service frequency between weekdays and weekends.

Technological investments also complement the above activities to support punctuality and flexibility, such as:

- Dynamic passenger information systems - electronic panels at bus stops that provide real-time information on the arrival of buses;
- Mobile applications – allowing passengers to track the location of vehicles in real-time and plan their journeys according to the current situation;
- Fleet management systems – monitoring delays and optimising vehicle traffic in real-time.

Ensuring the punctuality and flexibility of public transport requires both infrastructure investment and a better understanding of the changing needs of citizens. Regular passenger opinion surveys, the use of modern technology, and the expansion of the network will help improve the quality of the service. These measures will make public transport a more attractive alternative to the car while contributing to the sustainable development of cities.

5. Discussion of results and conclusions

While the case study of the city of Kalisz in Poland is idiographic (focusing on a single case), it may be relevant to the broader theoretical context of Stake (1995). As the study shows, in medium-sized cities such as Kalisz, public transport is crucial to ensure the mobility of residents and to counteract transport exclusion. These challenges result from lower population density, lower financial resources and the need to integrate different modes of transport. In Kalisz, with a population of around 100,000, public transport provides access to educational, health and administrative services, especially for people who do not have access to private transport. There has been a noticeable decline in the number of passengers using public transport, due to the increasing popularity of cars, the migration of young people to larger cities and the ageing of the population. Free public transport was introduced to counteract this trend, resulting in a 40% increase in ridership. However, the high cost of maintaining the public transport system remains a significant challenge. Like other medium-sized cities, Kalisz is trying to optimise its transport system by investing in ecological solutions, such as hybrid and electric buses, and obtaining external funding. Suburbanisation, or the expansion of cities into the suburbs, also remains a problem. In Kalisz and the surrounding area, neighbouring municipality residents often have limited access to public transport, resulting in greater car dependency. An important challenge is the integration of transport systems, the introduction of common agglomeration tickets, and the increased frequency of services. Examples from other cities, such as Rzeszów and Koszalin, show the positive effects of integrating public transport, improving accessibility and encouraging the use of public transport. Another challenge for public transport is the changing needs of passengers, including growing demands for travel comfort. Passengers expect comfort, punctuality and services tailored to their needs, which requires continuous modernisation of the fleet and infrastructure. Modernisation of the rolling stock, such as the purchase of modern low-floor electric buses, aims to improve the quality of services, reduce emissions and improve accessibility for people with disabilities. Kalisz, like other medium-sized cities, faces the challenge of sustainable development of public transport, including integration with suburban areas, ensuring adequate investment in modern rolling stock and adapting the transport system to the population's changing needs.

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Conflicts of Interest

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