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URBAN TRANSPORT INTEGRATION AS A CHALLENGE FOR TRANSPORT POLICY IN POLAND'S URBANIZED AREAS

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Purpose: Transport in Polish cities is primarily based on private car usage. The increasing number of vehicles creates numerous challenges, making it essential for city authorities to integrate various modes of transport within a multimodal urban travel system. Promoting public transport and other environmentally friendly forms of mobility through transport integration is crucial. This article aims to identify barriers to transport integration in urban areas and propose potential transport policy solutions.
Design/methodology/approach: The analysis employed qualitative content analysis of transport documents, a critical review of the literature, and a case study of selected European cities with high levels of transport integration.
Findings: The research conducted allows us to conclude that passenger transport in Poland remains poorly integrated and that the implemented solutions are fragmented. Therefore, it is proposed to adopt selected European solutions that could enhance the integration of urban transport in Poland's urban areas.
Research limitations/implications: It is important to emphasise the study's limitations, as it focuses on the qualitative analysis of documents and case studies. Consequently, the analysis does not fully address the identified research gap.
Originality/value: The topics discussed in the article are relevant from the perspective of urban decision-makers, as they critically examine the assumptions of city planning documents and juxtapose them with examples of transport integration solutions in selected European cities. The analysis has enabled the proposal of necessary solutions for implementation in Polish cities to enhance the level of integration.
Keywords: urban mobility, transport integration, transport policy, urbanised areas.
Category of the paper: Research paper.

1. Introduction

Urban development is inextricably linked to mobility needs. Demographic and social changes influence transport behavior, leading to an increasing preference for private cars. Their excessive number contributes to congestion, pollutant and noise emissions, and infrastructure degradation, particularly of roads (Hundert, 2018). A shortage of parking spaces in city centers, combined with car ownership, encourages suburban settlement and, consequently, urban sprawl (Baginski, 2011). Mobility issues extend travel times and heighten residents' dissatisfaction (Guzman et al., 2021). Therefore, promoting public transport (PT) as an environmentally friendly and relatively cost-effective mode of transportation is a reasonable approach.

Nevertheless, it is important to emphasise that PT often does not adequately serve suburban areas, and its schedules are not always adapted to individual user needs. In such cases, multimodal travel, which allows users to combine multiple modes of transport, presents a viable solution (Sakib et al., 2018). This approach better addresses transport needs and encourages a shift away from private car use. However, cross-modal integration is only possible with appropriate infrastructure and suprastructure, including Park & Ride (P&R) and Bike & Ride (B&R) facilities, transport interchanges, and well-developed shared mobility solutions (Matyas, 2020). Transport integration remains a key challenge for authorities in transport policy-making and investment planning.

The aim of this article is to identify barriers to transport integration in urbanised areas and to propose possible transport policy solutions. The authors have structured the article into several sections. First, the concepts of multimodal travel and transport integration are discussed in detail. This is followed by a presentation of the research methods employed, along with a justification for their selection. The subsequent section presents the results of the conducted analyses, compared with the findings of other researchers. Finally, the most important conclusions are summarised.

2. Literature review

Transport integration refers to the combination of different modes of transport, often collective PT, with individual means of transportation such as bicycles, scooters, or mopeds (Dyr, 2013). In recent years, shared mobility solutions such as car-sharing, car-pooling, and micromobility have been increasingly incorporated into everyday travel (Borkowski, Jażdżewska-Gutta, Szmelter-Jarosz, 2021). These solutions gained popularity during the COVID-19 pandemic, when access to collective PT was limited in many cities. This trend is

confirmed by data on the use of different modes of transport between 2014 and 2022 (Figure 1).

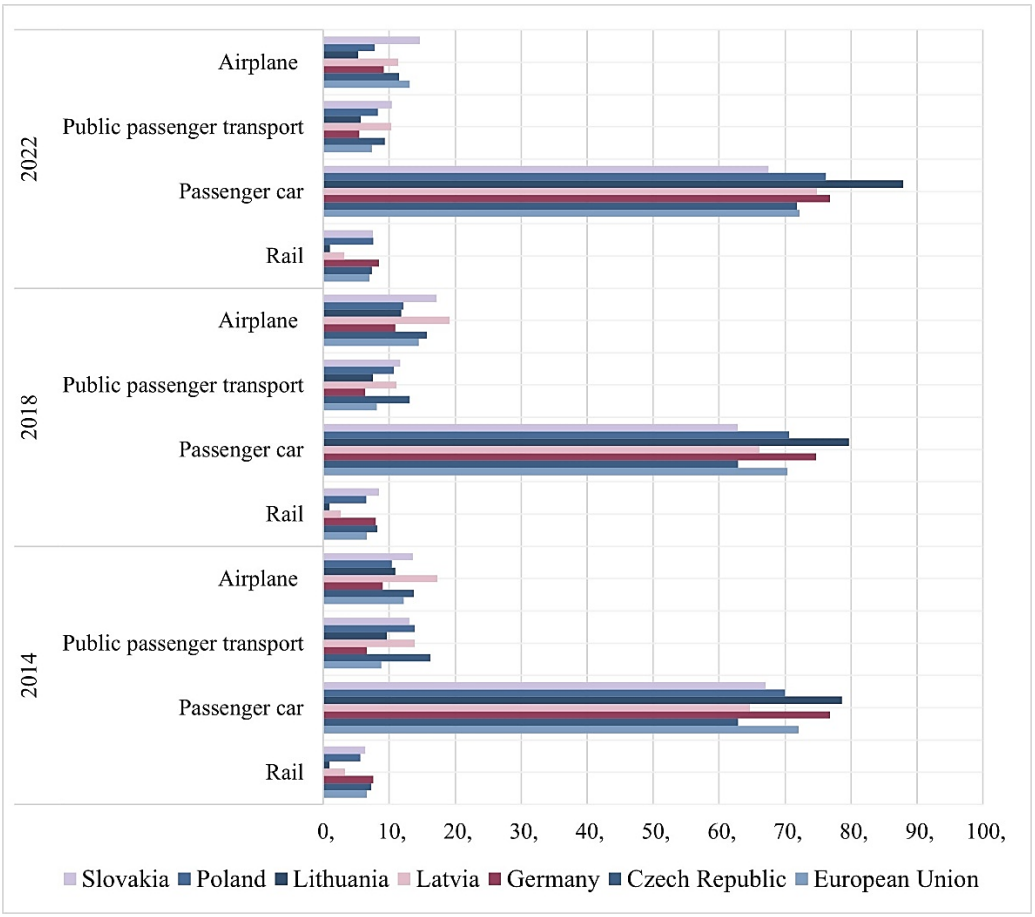

Figure 1. Modal split of transport usage in selected European countries between 2014 and 2022 (in %).
Source: Eurostat, https://ec.europa.eu/eurostat/databrowser/view/tran_hv_ms_psmod__custom_14790079/default/table?lang=en, 23.12.2024.

In 2022, the share of users employing private passenger cars increased by 1.8 percentage points across the European Union compared to 2018, with a rise of 5.6 percentage points observed in Poland. Likewise, the use of collective transport increased by 0.7 percentage points in the European Union and by 2.4 percentage points in Poland relative to 2018. The distribution of transport usage depends on several factors, including the urban transport management system (Hirschhorn, Veeneman, van de Velde, 2019), the transport policies and strategies implemented for urban planning and public transport promotion (Mouratidis, Ettema, Næss, 2019), perceptions of safety and ease of travel (Singh, 2020), and the needs and expectations of users (Scerri, Attard, 2023).

Intermodal integration remains insufficient to ensure seamless multimodal travel. Passenger information systems, fare-ticketing systems, and timetables should also be harmonised (Koźlak, 2020). The integration process requires stakeholder education and involvement at all planning stages. Research indicates that residents with lower levels of education and those living in suburban areas tend to be more sceptical about integration solutions (Strebel, 2022). Barriers to

integration include complex fare structures and the lack of convenient ticketing options (Gambetta, Barić, 2020), as well as underdeveloped infrastructure (Bryniarska, Żakowska, 2017). From a user perspective, transport interchanges should facilitate a quick and convenient mode transfer (Nielsen et al., 2021). A crucial aspect of integration is the availability of diverse transport modes, including on-demand transport (Franco, Johnston, McCormick, 2020), which can help reduce private car usage in areas not served by collective PT.

3. Research methods

This paper employs three research methods (see Figure 2) to conduct a detailed analysis of the barriers to transport integration and to identify solutions that could enhance the level of transport integration in Polish cities and urban areas.

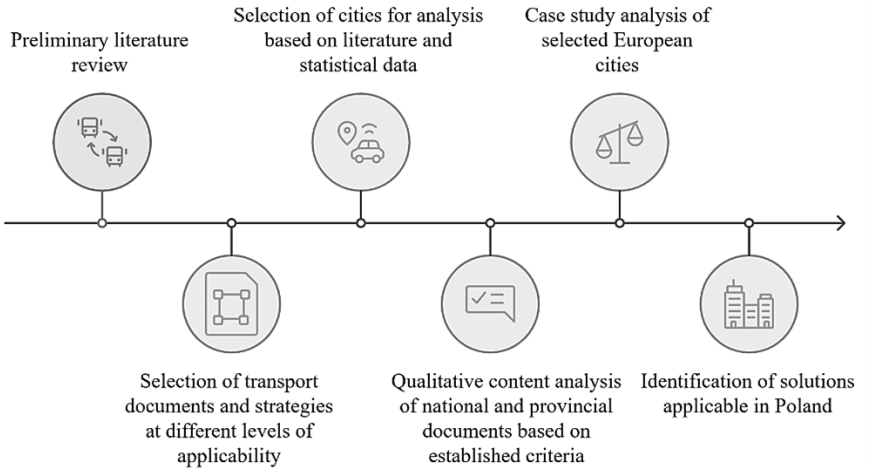

Figure 2. Research procedure.

Source: own elaboration.

The literature review was conducted using the supportive desk research method (Bednarowska, 2015). The application of this method was driven by the need to outline the general context of the transport integration process and to define the criteria for the qualitative content analysis of documents. Subsequently, transport documents of a strategic nature at the national and provincial levels were selected for detailed analysis (Table 1). The analysis excluded documents from the Lower Silesian (2014) and Podlaskie (2013) voivodeships, as they were deemed outdated by the authors.

Table 1.
List of analysed strategic documents

Document Name	Abbreviation	Provincial (P) or National (n) Scope	Year	Perspective
Sustainable Transport Development Strategy until 2030	STDS PL	N	2019	2020-2030
Transport System Development Strategy of the Silesian Voivodeship	Silesian TSDS	P	2014	2015-2030
Transport Plan of the Opole Voivodeship 2030	Opole TP	P	2024	2024-2030
Transport Plan of the Warmian-Masurian Voivodeship until 2030 (with a perspective until 2050)	Warmian-Masurian TP	P	2023	2023-2050
Strategic Transport Development Program of the Lublin Voivodeship until 2030 (with a perspective until 2040)	Lublin STDP	P	2021	2021-2040
Strategic Transport Development Program of the Podkarpackie Voivodeship until 2030	Podkarpackie STDP	P	2024	2021-2027
Regional Transport Plan for the Greater Poland Voivodeship with a perspective until 2030	Greater Poland RTP	P	2023	2023-2030
Regional Transport Plan of the Kuyavian-Pomeranian Voivodeship for 2021-2027	Kuyavian-Pomeranian RTP	P	2024	2021-2027
Regional Transport Plan of the Łódź Voivodeship	Łódź RTP	P	2024	2024-2050
Regional Transport Plan of the Lesser Poland Voivodeship for 2021-2027 with a perspective until 2030	Lesser Poland RTP	P	2024	2021-2030
Regional Transport Plan of the Masovian Voivodeship with a perspective until 2030	Masovian RTP	P	2022	2022-2030
Regional Transport Plan of the Świętokrzyskie Voivodeship	Świętokrzyskie RTP	P	2023	2021-2030
Regional Transport Plan of the West Pomeranian Voivodeship until 2030	West Pomeranian RTP	P	2023	2021-2027
Regional Strategic Program for Mobility and Transport	Pomeranian RSP	P	2022	2022-2030
Regional Transport Development Program of the Lubuskie Voivodeship with a development forecast until 2030	Lubuskie RTDP	P	2023	2021-2030

Source: own elaboration.

The criteria for the qualitative content analysis include challenges related to transport development in urbanised areas, planned investments, references to transport integration, and the consideration of different transport modes. The document analysis enabled the identification of key objectives set by provincial governments and provided insights into the direction of transport development at the national level (Mróz-Jagiełło, Wolanin, 2013).

Based on desk research, European cities with a high level of transport integration in urban areas were identified. This selection was informed by the experiences of researchers who have analysed these cities in their studies. The case study method enables an examination of applied practices that may also prove effective in other cities, while considering their specific characteristics (Krehl, Weck, 2020; Lavarda, Bellucci, 2022). The analysis of challenges and

solutions implemented in European cities facilitated the identification of specific measures applicable to Polish urbanised areas. According to the authors, these solutions best address the needs of local communities and are feasible in financial, organisational, and spatial terms.

4. Results

An analysis of transport documents at the national and provincial levels has shown that integration is a key component of transport system development. This is evidenced by the fact that the word "integration" appears in every document. It is most frequently mentioned in the Masovian RTP (52 times), the Greater Poland RTP (53 times), and the Lesser Poland RTP (60 times). The term refers to various forms of integration (Figure 3).

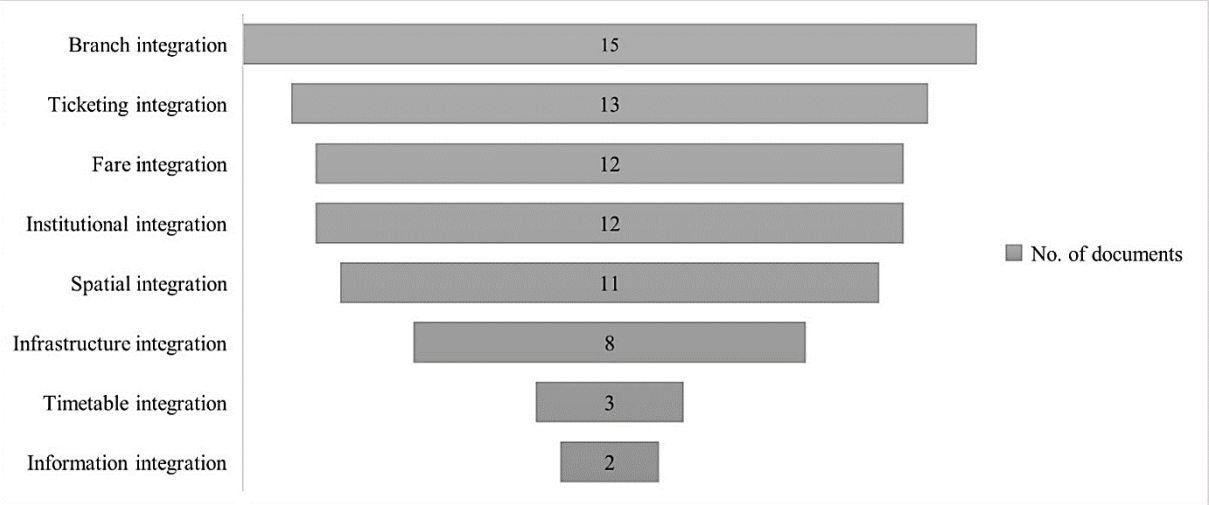

Figure 1. Types of integration included in documents.
Source: own elaboration.

It is noteworthy that the STDS PL considers only branch, fare, ticketing, and institutional integration. All analysed documents reference branch integration, understood as the coordination of different modes of transport. Ticketing and fare integration were equally prevalent, appearing in 13 and 12 documents, respectively. The least frequently mentioned forms of integration were infrastructure integration (8 documents), timetable integration across different transport modes (3 documents – Małopolskie RTP, Lubuskie RTDP, and Pomeranian RSP), and passenger information system integration, which was included in only two documents (Masovian RTP and Warmian-Masurian TP).

From the passenger's perspective, an integrated information system is crucial for seamless mobility, facilitating quick transfers and efficient trip planning. However, provincial authorities rarely prioritise passenger information system integration in their development plans, failing to take steps to improve it. The lack of integration also affects timetable coordination, which can

hinder smooth transfers and force passengers to endure long waiting times for a convenient connection.

The analysed documents also considered different transport modes (Figure 4). However, the STDS PL did not account for all types, omitting trolleybuses, scooters, and micromobility solutions.

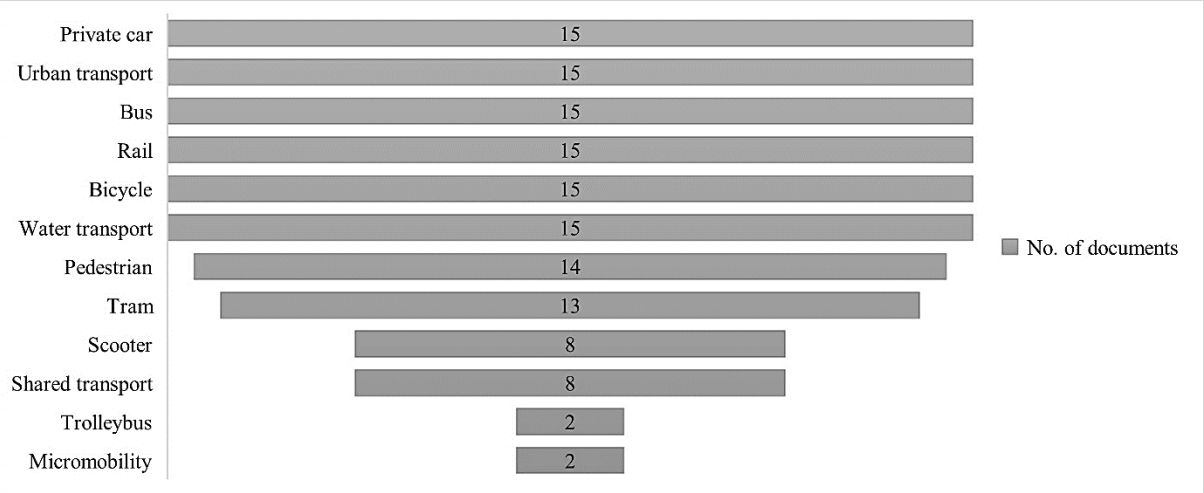

Figure 2. Means of transport included in documents.

Source: own elaboration.

Private cars, urban transport, buses, rail transport (agglomeration, regional, and long-distance), bicycles, and water transport are included in all analysed documents. However, pedestrian transport is not addressed in the Silesian TSDS, and trams are not mentioned in the Warmian-Masurian TP or the West Pomeranian RTP. Trolleybuses operate in only three Polish cities—Gdynia, Tychy, and Lublin—and are therefore included in the Pomeranian RSP and Silesian TSDS, but not in the Lublin STDP. Micromobility, on the other hand, is referenced in the Opole TP and the Podkarpackie STDP. Both micromobility—defined as the use of non-fuel-powered lightweight vehicles for travel—and shared mobility, which involves sharing transport modes with other users instead of owning them, are rarely addressed in mobility strategy documents.

A number of challenges related to transport integration have been identified in the analysed documents. These challenges have been classified into six categories (Figure 5).

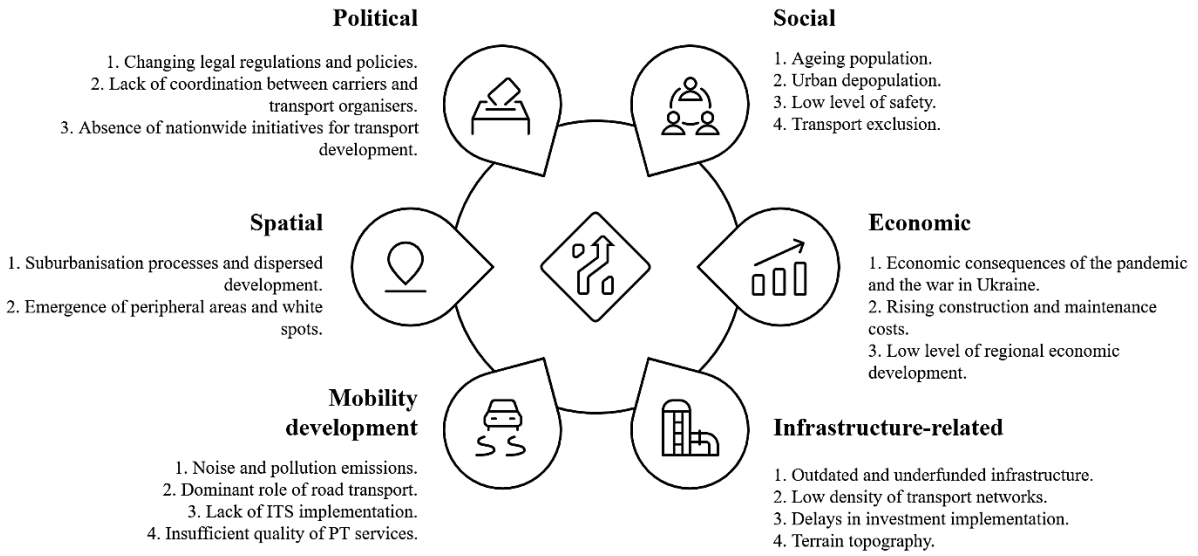

Figure 3. Challenges of transport integration.

Source: own elaboration.

The main social challenges include an ageing population and low fertility rates, which necessitate adapting infrastructure and suprastructure to the needs of people with reduced mobility. Another key issue is the existence of peripheral areas that are poorly connected to county towns or voivodeship capitals. This challenge was highlighted in several documents, including the Podkarpackie STDP and Greater Poland RTP. The problem of urban depopulation was noted in multiple documents, particularly in the Masovian RTP and Greater Poland RTP. The Lublin STDP identified the lasting effects of historical partitions, which are still evident in the voivodeship's poor connectivity with the rest of the country. Additionally, the Masovian RTP and Warmian-Masurian TP addressed the social consequences of the COVID-19 pandemic. Economic challenges include the low level of regional economic development and the impact of economic crises. The documents highlight the high and rising costs of modernising, constructing, and maintaining transport infrastructure. The main challenges in this area stem from underinvestment, particularly in less developed voivodeships such as Podlaskie and Lubelskie. The documents also emphasise the low quality of transport services, including low service frequency and the lack of intermodal integration. The limited use of Intelligent Transport Systems (ITS) further increases PT travel times and compromises safety. It is also important to consider political challenges, particularly those related to legislative and regulatory changes at the European Union level.

In response to the integration challenges identified, the most significant investments aimed at increasing the degree of transport integration in urbanised areas have been outlined. These were compared with key measures implemented in selected European cities that exhibit a high level of transport integration (Table 2).

Table 1.
Proposed measures for implementation in Poland

City	Key actions of European cities	Actions Possible for Implementation in Poland
Amsterdam (Netherlands)	• Pilot program *Mokumflex* – free on-demand transport. • Full ticketing integration within the national smart electronic card system. • Close cooperation between local governments and operators while maintaining service design flexibility. • Implementation of the *Mobility-as-a-Service* concept (*Whim* i *Tranzer*). • Adoption of transport and mobility development strategies, including the Transport Act.	• Implementation and expansion of door-to-door and demand-responsive transport (DRT) in suburban and rural areas, integrated with PT. • Further ticketing and fare integration at the regional level, followed by nationwide integration. • Development of nationwide principles for cooperation between operators and local governments. • Implementation of mandatory transport policies.
Seville (Spain)	• Construction of segregated bicycle lanes in urban and suburban areas. • Expansion of B&R and P&R systems. • Development of high-speed rail within the Madrid-Seville metropolitan area. • Connection of the city and airport via PT. • Designation of Metropolitan Parks as protected, non-developable areas.	• Promotion of cycling through educational initiatives and infrastructure improvements. • Development of metropolitan and high-speed rail networks. • Implementation of the *Mobility-as-a-Service* concept in cities and suburban areas. • Protection of natural green spaces.
Helsinki (Finland)	• Systematic integration of transport development, spatial planning, and urban development. • Pilot project for micromobility development – *Kutsuplus*. • Implementation of the *Mobility-as-a-Service* concept. • Expansion of P&R and B&R systems near railway stations. • KUHA project – small-scale investments to enhance pedestrian and cycling infrastructure.	• Integration of mobility, spatial planning, and urban development in strategic and planning documents. • Development of micromobility and shared transport within the *Mobility-as-a-Service* concept. • Small-scale investments to improve pedestrian and cycling infrastructure.

Source: own elaboration based on dispersed materials.

The reviewed documents are predominantly focused on objectives such as implementing low-emission transport, constructing and modernising infrastructure—including interchanges—increasing the level of integration, long-term transport development planning, and expanding the use of ITS. At the same time, the most significant planned investments include the construction of bypasses and new roads, the modernisation of regional and local railway lines, the development of interchanges with B&R and P&R facilities, the procurement of low-emission rolling stock, the creation of so-called 'green stops,' and educational initiatives targeting transport users. These investments align, at least in part, with measures implemented in European cities. However, Polish local governments continue to prioritise road transport development, while initiatives to enhance pedestrian and cycling infrastructure remain insufficient. For example, micro-investments that could be implemented through public-private partnerships or Civic Budgets are largely absent. Additionally, on-demand transport systems, which serve as a complement to the PT network in peripheral areas, remain underdeveloped in Poland.

Conclusion

Transport integration is one of the most crucial factors in enhancing regional accessibility. Urbanised areas face numerous challenges related to transport and mobility, which can significantly impact the quality of life. Consequently, regional authorities strive to improve transport integration, primarily focusing on intermodal and ticketing integration. However, these measures remain insufficient given the increasing transport demands that extend beyond individual provinces. Therefore, national authorities should impose stronger obligations on municipalities to implement transport strategies that are fully integrated with urban planning and construction policies. The examples of Helsinki and Amsterdam demonstrate that well-designed transport policies can yield tangible benefits.

Transport integration requires a systemic approach to management, including investment planning. The PT network in the provinces is unevenly developed, primarily concentrated in large cities, which contributes to the emergence of peripheral areas and transport "white spots". Their elimination should be based on the development of alternative mobility solutions, such as micromobility, DRT, or shared mobility. The analysed documents suggest that improving accessibility is primarily associated with the expansion of road transport. However, based on the examples of Seville and Helsinki, regional authorities should prioritise enhancing pedestrian and cycling infrastructure and integrating it more effectively with PT. This, in turn, would provide residents with greater opportunities to reduce reliance on private cars.

The study focused on a qualitative content analysis of strategic documents at the national and voivodeship levels; therefore, the results cannot be interpreted in the context of local policies. In the future, the research should be expanded to include an analysis of documents at the regional and municipal levels. The applied methodology was based on document analysis and a review of the relevant literature. Future studies should incorporate quantitative research methods to complement the findings.

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