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Shaping Demand in Olsztyn's Public Transport: Policy, Operational Practices and Public Perception

Stanisław Ejdys[1], Robert Rogaczewski[2]*

[1]Ignacy Moscicki's University of Applied Sciences in Ciechanów, Poland

https://orcid.org/0000-0003-4312-7880

[2]Ignacy Moscicki's University of Applied Sciences in Ciechanów, Poland

https://orcid.org/0000-0002-8605-4792

[*]corresponding author's e-mail: stanislaw.ejdys@pansim.edu.pl

Abstract: The article presents a multifaceted analysis of the mechanisms shaping demand for public transport in Olsztyn between 2012 and 2024, interpreting them in the context of sustainable mobility goals and environmental protection. The authors employ data triangulation – strategic documents, operational data, and media discourse analysis – demonstrating a significant gap between the declared objectives of transport policy and managerial practice. Reductions in service frequency, limitations in the route network, and investment delays lead to a phenomenon described as "demand suppression." The authors emphasize that a stable and developing public transport offer is one of the key tools for reducing emissions and limiting the negative environmental impacts of transportation. They also indicate that, to reverse the trend of unintentional demand reduction for public transport services and simultaneously support environmental protection, the city should restore service supply stability, improve transport integration, and ensure long-term consistency in implementing its sustainable mobility strategy.

Keywords: demand shaping, public transport, environmental protection, sustainable mobility Olsztyn

1. Introduction

Modern cities face increasingly significant challenges related to the rapidly growing demand for transport services. This situation, combined with persistent limitations in infrastructure capacity and the inability to increase service supply, generates rising levels of congestion, environmental degradation, and economic losses (Rogaczewski 2019). The literature emphasizes that traditional mobility management models, based on expanding infrastructure and increasing system capacity, have become insufficient in the face of contemporary challenges associated with excessive demand for transport services (Goodwin 1996, Litman 2024, Suchorzewski 2012). It is therefore necessary to employ more complex transport policy instruments, including regulatory, economic, and organizational measures, to shape users' travel behavior toward more sustainable forms of mobility within the city (Marsden & Reardon 2017, Schiller et al. 2010, Dyczkowska et al. 2023).

It is worth noting that shaping demand for transport services is a key issue in contemporary research on urban mobility, particularly in the context of achieving sustainable development goals and climate policy. Among researchers, there is a belief that reducing the demand for public transport travel – both in numerical and structural terms – is possible through various measures. These include soft instruments, such as information policies, fare integration, and improving service accessibility, as well as hard instruments based on legal regulations, fees, or restrictions on access to infrastructure (Banister 2008).

In this regard, Olsztyn is a city where mobility policy has been significantly reshaped over the past decade through the implementation and development of a tram system, considered a key element in boosting the competitiveness of public transport relative to the car. The infrastructure investments carried out have substantially changed the network of connections and the operational logic of the entire public transport system. It is difficult to understand, however, why these measures have not translated into lasting financial stabilization of the entire public transport system, nor into halting the trend of increasing individual motorization (Radzimski & Gadziński 2021).

The search for an answer to this question is narrowed to the aim of the study, which is the identification and analysis of instruments used to shape demand in Olsztyn's public transport system, as well as an assessment of their consistency with the principles of sustainable mobility (Chamier-Gliszczynski 2016). The analysis is based on a review of strategic documents, operational and performance data, and media coverage. The choice of a multi-source approach was driven by the need to capture both the formal assumptions of Olsztyn's transport policy and the actual management practices related to demand shaping.

The first stage of the study was a systematic analysis of documents shaping the local mobility policy. Documents in force between 2012 and 2024 were taken into account, including, among others:

- The Sustainable Development Plan for Public Collective Transport for the City of Olsztyn,
- The Sustainable Urban Mobility Plan for the Functional Urban Area of Olsztyn,
- the city's spatial planning documents,
- local sectoral programmes and strategies (transport, environment, spatial policy).

The documents were subjected to content analysis, focusing on identifying the objectives, tools, and assumptions related to demand management and the role of public transport in mobility policy (Chamier-Gliszczyński 2012).

The second stage included an analysis of quantitative data on the functioning of public transport in Olsztyn. Where available, the following were taken into account:

- data on transport work (bus-kilometres/train-kilometres),
- service frequency on bus and tram lines,
- data on passenger flows,
- information on changes in the transport service offer in the years 2015-2024.

The data were analysed using descriptive statistical methods and inter-period comparisons to identify trends in the supply of transport services and their potential impact on demand.

The third component of the study was a qualitative analysis of media coverage. A review was conducted of both local news media and communications issued by the city authorities and transport operators. This stage aimed to identify crisis situations, public sentiment, and public debates regarding changes to transport services and the phenomenon known as "demand suppression." The materials published between 2015 and 2024 were analysed, including, among others:

- press articles concerning disruptions in the functioning of the system (e.g., the cyberattack on ZDZiT in Olsztyn, reductions in transport service levels),
- announcements from public transport services and the city hall,
- statements made by government representatives and experts.

The media content was subjected to discourse analysis, focusing on how different stakeholder groups interpret changes in demand and supply.

A methodological triangulation was applied, combining results from document analysis, operational data, and media sources. Data integration consisted of:

- comparing the declared objectives of mobility policy with actual changes in transport service offerings,
- identifying points of divergence between strategic planning and operational practice,
- assessing the coherence of demand-management measures with the concept of sustainable mobility,
- distinguishing demand-management instruments – both intentional and unintentional.

The analysis was conducted in accordance with the mobility policy research paradigm, which enables the evaluation of the effectiveness and consequences of applied instruments in the local context.

The study accounted for three main limitations:

- the inconsistency of available operational data, including the lack of complete, publicly accessible passenger flow data after 2020,
- the volatility of external factors such as the COVID-19 pandemic, rising energy and labor costs, which may have affected outcomes independently of the actions taken by local authorities,
- the lack of complete transparency in management processes, which made it impossible to reconstruct the motivations behind operational decisions fully,
- Despite these limitations, the adopted methodology enables reliable identification of demand-shaping mechanisms and an assessment of their compliance with the principles of sustainable mobility.

2. Literature Review

Demand management in public transport systems constitutes an integral part of the broader concept of urban transport management. Within sustainable mobility policy, it is regarded as an effective tool for shaping users' travel behaviour. In the subject literature, it is defined as a set of actions aimed at modifying travel demand through the use of organizational, economic, informational, and spatial instruments that serve as alternatives or complements to infrastructure investments (Barcik & Bylinko 2015, Bylinko 2020).

An important dimension of shaping demand is the impact on the reliability and resilience of public transport systems. The literature shows (van Oort 2011) that in the face of rising operating costs, demographic changes, and diverse mobility patterns, urban decision-makers increasingly choose to reduce service frequency, shorten routes, or temporarily suspend selected lines. However, this phenomenon raises considerable controversy, as it affects not only the efficiency of the transport system but also residents' quality of life and the level of sustainable mobility in cities (Litman 2023). Agreeing with this view requires only adding that decisions made at the strategic and tactical levels determine the system's ability to maintain an acceptable level of service under disrupted conditions.

This causes the phenomenon to align with broader discussions about the functioning of public transport, its sensitivity to budget fluctuations, and the risk of losing competitiveness compared to car transport, especially in cities with a high pace of suburbanization. Accompanying this are several premises for deliberately reducing the supply of transport services. These range from budgetary pressure and the pursuit of operational balance, through the need to adjust supply to lasting changes in demand, and ending with technical limitations of vehicle capacity, as well as the desire to optimize the network and concentrate resources on the most efficient routes (Cats & Jenelius 2018, de Weert & Gkiotsalitis 2021, Ejdys 2023, Redelmeier & El-Geneidy 2024, Woźniak et al. 2015).

Research on public transport demand indicates that once vehicle occupancy exceeds a certain threshold, service quality deteriorates significantly. As a result, travel times and dwell times at stops increase, travel-time variability grows, and passenger comfort noticeably declines (Balcombe et al. 2004, Li & Hensher 2013, Tirachini et al. 2013). Traditionally, the response to these challenges has been to increase service supply by boosting service frequency or deploying higher-capacity vehicles. In many cities, however, this approach encounters financial, institutional, and spatial constraints, which limit the potential for further expansion of infrastructure and service provision. This stems from the fact that reducing transport service supply in public transit has in recent years become one of the key – and at the same time most controversial – issues in urban transport policy, which should combine the rationalization of supply with the rationalization of demand, in line with the principle that mobility should be optimal rather than maximal (Szarata 2020).

It is difficult to disagree with this premise, especially since several instruments are available to support demand management in urban transport systems and policies. The first group consists of economic tools, including differentiated fare structures. Depending on the time of day, different prices are applied, as well as reward systems for using services outside peak hours. Eriksson's (2023) research indicates that financial tools can be effective only when users have temporal flexibility, which limits their effectiveness among commuters traveling to work or classes. The second group comprises organizational instruments, including increasing service frequency, strengthening supply in the most heavily loaded segments, implementing public transport priority measures, and employing dynamic operational control methods, such as dispatching additional vehicles to support service delivery.

An important role in the process of shaping demand is also played by informational instruments, classified as so-called soft forms of influencing passenger behavior. These include, among others, providing information on vehicle occupancy, recommending less congested routes or services, and conducting social marketing activities. Research by Kapatsili, Cats, and Jenelius (2024) has shown that perceptions of crowding differ across passenger segments. This indicates the particular usefulness of personalized information, which is more capable of influencing changes in travel behavior.

A fourth group of tools consists of spatial and planning measures aimed at long-term demand reduction. Concepts such as the compact city or the 15-minute city model promote increased walking and cycling, as well as reduced short public transport trips (Gehl 2010).

In reference to the above, it should be added that empirical studies on the effectiveness of travel demand management tools indicate that the most significant effects are achieved through the simultaneous use of economic, organizational, and informational instruments. Eriksson (2023) demonstrated that combining them—especially with labour-market measures such as flexible working hours – can significantly reduce peak-hour traffic concentration. Analyses by DIW Berlin (2019) emphasize the economic dimension of vehicle crowding, noting that even a slight reduction in occupancy can bring measurable social benefits. International literature highlights that vehicle overcrowding is associated with high social costs, such as:

- passenger discomfort,
- reduced commercial speed,
- lengthened passenger exchange processes,
- deterioration of service reliability (Daniels & Mulley 2012, DIW Berlin, 2019).

Hence, the view that active demand management can significantly improve system performance and the quality of services provided.

In Polish research, special attention should be given to the long-term studies on passenger preferences and behaviors conducted in Gdynia (Grzelec 2023). These studies show that demand for public transport is characterized by significant temporal concentration during the morning and afternoon peak hours, leading to system capacity overload. Therefore, the primary goal of demand management in public transport should not be to reduce the overall number of trips, but rather to rationalize them through time-shifting and by reducing load intensity during critical periods of the day.

A significant research gap, however, concerns analyses of the phenomenon of "demand suppression" – understood as the unintended reduction in public transport use resulting from reduced service supply, organizational changes, or crisis situations. In the international literature, this phenomenon is mainly described in the context of American and British cities (Taylor & Fink 2013). Such analyses are lacking in the Polish context, particularly with regard to medium-sized cities. In this respect, Olsztyn constitutes an interesting research field due to the tensions observed in recent years between the declared goals of sustainable mobility and the practice of reducing transport work.

The conclusions from the literature review (Ejdys & Lasota 2022) demonstrate that demand management in urban transport is a multidimensional process that requires a coherent approach in which organizational, economic, and informational measures complement one another. From the perspective of transport policy, it is crucial to understand that demand management does not lead to a reduction in travel, but to its more efficient distribution in time and space. At the same time, there is a clear need for further empirical research, particularly ex post evaluations of implemented measures and panel studies that would allow for the observation of long-term changes in users' travel behaviors.

3. Shaping Transport Demand in Cities

Shaping the demand for transport services in cities is one of the key challenges facing modern metropolitan areas. The scale and multidimensional nature of this challenge – already mentioned – are widely documented in the literature and in reports by international institutions (World Economic Forum 2021). The increase in mobility within urbanized areas, combined with limited infrastructure capacity and constrained public transport options, leads to chronic overload of the city's transport system. As a result, these systems increasingly face conflicting expectations. On the one hand, they are expected to reduce the negative impacts of transport on the environment and urban space; on the other, they must ensure a high level of accessibility and support the competitiveness of the urban economy (Klodawski et al. 2024).

This explains why the traditional paradigm of transport development – based on the successive expansion of infrastructure and the increase of transport performance – is becoming increasingly inadequate in the face of contemporary challenges (Krych 2024). Moreover, given financial and spatial constraints, as well as the necessity to achieve climate and environmental goals, this approach must be considered insufficient as the primary means of responding to growing mobility needs (Newman & Kenworthy 2015). It is also increasingly evident that expanding the supply of transport infrastructure and services further cannot effectively address problems stemming from traffic congestion, spatial constraints, and rising environmental pressures (Paddeu 2024). The literature demonstrates that the traditional model, which assumes forecasting demand and adjusting investment scale to predicted needs, in practice perpetuates unsustainable mobility patterns and contributes to the emergence of so-called induced traffic (Naess 2014).

Contemporary conditions of urban development require moving away from a classical infrastructure-oriented approach toward more complex, integrated strategies, in which active transport demand management plays a key role (Wierzbicka & Kmiecik 2022). This approach not only enables reducing travel demand in specific relationships but also shaping it in ways consistent with climate, health, and spatial policy objectives. This implies the need to employ a wide range of solutions, including: developing sustainable modes of travel, improving the efficiency of existing infrastructure use, digitalising transport processes, and consciously limiting excessive demand where it generates the greatest external costs (Szarata 2020).

Studies devoted to transport demand management in cities also emphasise that "soft" measures – such as demand reduction through appropriate organisation, information, and pricing instruments – may constitute relatively low-cost yet effective complements to traditional investment tools (Starowicz 2017). Such measures fit into the broader paradigm of sustainable urban mobility, which assumes the necessity of reconciling environmental, social, and economic goals by shifting a portion of trips from individual to collective transport and by reducing excessive demand for transport as such (Beim 2023, Ejdys 2023, United Nations 2023, Ladi et al. 2022).

Regardless of the opinions presented, it should be added that shaping the demand for transport services in cities can take various forms. Understood as a set of actions aimed at reducing the number of trips made by private car or shifting them to more sustainable modes of transport, it may take the form of:

- a political perspective, which includes regulations, fiscal mechanisms, and strategic planning instruments,
- an operational strategy, concerning the management of public transport services, technologies, and organizational practices,
- a social perception, relating to user acceptance, perceived fairness, and expectations.

From a political perspective, demand management is a key tool for achieving goals such as reducing greenhouse gas emissions, improving air quality, alleviating transport congestion, and increasing public transport accessibility for different social groups. Research shows that measures such as congestion charges, increased parking fees, or restrictions on private vehicle entry can effectively discourage car use. At the same time, increasing service frequency, improving the comfort of public transport journeys, or subsidizing public transport tickets can be understood as a set of actions influencing travellers' decisions to choose public transport.

Of course, the effective implementation of these measures requires understanding not only operational mechanisms but also social acceptance. Without it, even well-designed actions may encounter resistance or prove ineffective (Moeinaddini 2024).

In operational terms, demand shaping encompasses a set of organizational, tariff-based, and informational instruments that make it possible to reduce infrastructure load during peak hours, increase the attractiveness of alternative modes of transport, and counteract the degradation of service quality, which may lead to passengers shifting to individual transport (Cervero 2013).

A key aspect remains social perception – the way city users view both proposed restrictions and improvements in the transport system. Perceptions of comfort, safety, accessibility, and fairness can influence acceptance and the willingness to change travel behavior. In recent years, interest has grown in examining the integration of social aspects in public transport planning, including the needs of different user groups and the relationship between efficiency and equity (Hrelja et al. 2024). Naturally, without understanding these processes and properly defining objectives and benefits, demand-restricting measures may be perceived as burdensome, thereby weakening their effectiveness.

A review of the literature suggests that the indicated triad of approaches is crucial to the effectiveness of demand-shaping measures and is, at the same time, rarely analyzed holistically (Hrelja et al. 2024).

The importance of the issue has led to demand-management topics being incorporated into strategic documents of the European Union (COM, 2019, EEA, 2019b, 2019c) and into Poland's climate policy (Ministry of Infrastructure, 2019). In these documents, transport demand shaping is identified as the first and fundamental stage of the decarbonization process—preceding the replacement of existing transport modes with less emission-intensive technologies (Rogaczewski & Ejdys 2025). Moreover, national studies on spatial planning and low-emission mobility emphasize the development of the "15-minute city," the integration of functions at the local scale, and the limitation of suburbanization as effective tools for reducing transport needs. Naturally, achieving these goals is not possible without appropriately targeted spatial planning, since land is one of the most constrained resources in contemporary cities (Beim & Modrzewski 2013).

In this context, demand shaping is understood as reducing the number and length of trips made by private car while simultaneously increasing the use of public transport and other forms of sustainable mobility (Ejdys 2021). However, this does not change the fact that the traditional approach—based solely on expanding infrastructure and increasing transport supply—is no longer sufficient in light of contemporary functional and environmental conditions in cities. Active transport demand management is becoming increasingly important. Transport demand management (TDM) and urban mobility management concepts are being implemented more frequently in Poland—both at the planning and operational levels—as tools for balancing the costs of transport system functioning with user expectations and climate policy objectives. This phenomenon, however, raises numerous controversies, as it affects not only the efficiency of the transport system but also residents' quality of life and the overall sustainability of urban mobility (Litman 2023).

4. Study of the Size and Structure of Demand for Services in Olsztyn's Public Transport

The efficient and effective functioning of urban transport requires systematic evaluation. This is especially important in the context of rising operating costs, the need to modernize the fleet, and the requirements of sustainable mobility. It is therefore not surprising that the infrastructure investments made in recent years, as well

as changes in Olsztyn's transport policy, justify the need for a renewed assessment. This is all the more relevant given that both the structure of the system and its level of profitability have undergone significant changes.

Conducting such an assessment is also crucial for other reasons. It is hard not to notice that the results obtained may help identify key challenges and evaluate the prospects for further development of the city's entire transport system. Equally important is the fact that Olsztyn's public transport system involves many stakeholders, each contributing their part and expecting specific outcomes.

In view of the above, it is reasonable to state that the assessment presented here is limited by the scope of the analysis conducted, which makes it impossible to account for all relevant aspects and interdependencies present in the complete source material. Additionally, the general requirements regarding the length of the study necessitated the selection of content, leading to a narrowing of the argumentation and the omission of some potentially relevant elements. As a result, the conclusions presented are concise in nature, and their complete verification requires a broader and more in-depth study.

Such an approach to the problem justifies only a superficial discussion of the analysis of transport work carried out within the city's public transport system. **Figure 1** presents its dynamics, measured in vehicle-kilometres for buses and train-kilometres for trams, in the years 2023-2025. A clear differentiation in the rate of change between the two subsystems of public transport is evident, allowing assessment of the efficiency of utilising the available transport capacity.

The analysis of transport work indicates significant changes in the structure of local transport. Based on the data presented in the figure, it can be observed that the total number of vehicle-kilometres (vkm) performed in bus transport remains relatively stable, with a slight downward trend from 7,880,909 vkm in 2023 to 7,560,000 vkm in 2025. At the same time, the operational work performed by trams is increasing dynamically. This value rises from 739,201 tkm in 2023 to 1,470,804 tkm in 2024, nearly doubling the initial value. In 2025, it remains at a similar level (1,436,000 tkm), which may indicate stabilisation of the new transport offer structure.

When comparing both forms of transport, it should be noted that the transport work of buses is many times greater than that of trams, due to their systemic role, route flexibility, and greater coverage of the city area. At the same time, the greater dynamics of changes in tram transport reflect intensive development processes within this segment. The increasing share of trams in transport work is viewed as an effect of sustainable mobility efforts, which favour rail-based transport due to its energy efficiency, infrastructure durability, and lower environmental impact.

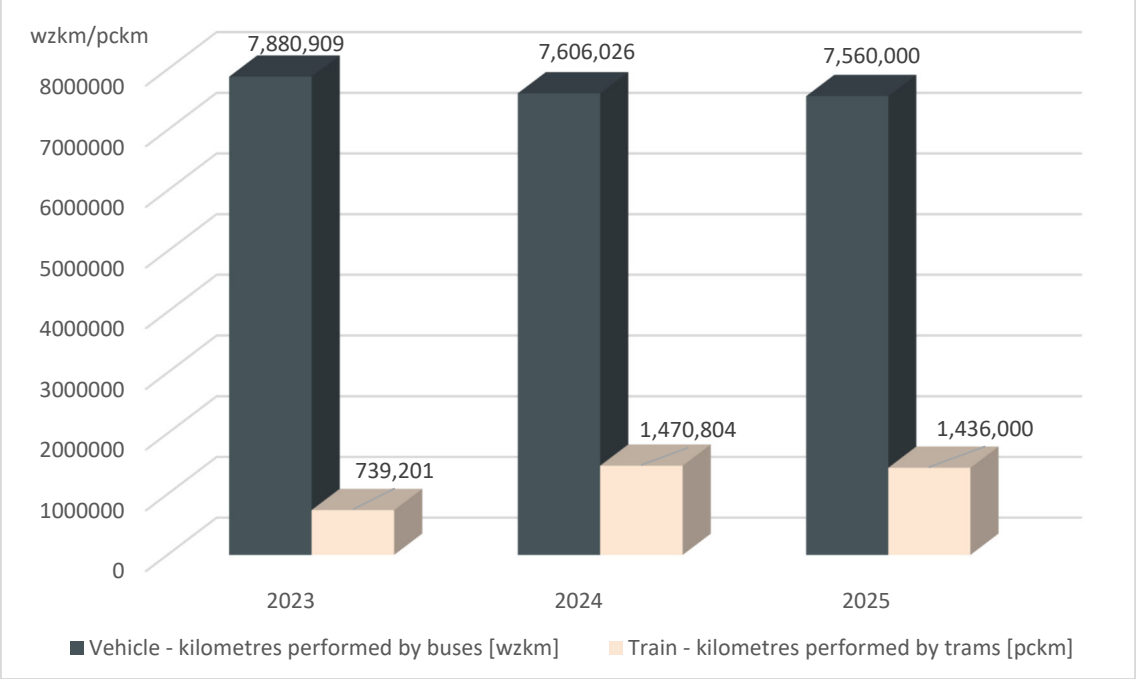

Fig. 1. Transport work in Olsztyn public transport

Undoubtedly, the presented data indicate an evolution in the structure of transport work within the public transport system over the analyzed years. Maintaining a stable, though slightly decreasing, level of bus service work combined with a significant increase in tram service work in 2024 and its stabilization in 2025 suggests a gradual shift of the load toward trams as a complement and support for public transport.

Considering the changes in a broader context, i.e., the development of Olsztyn's public transport system, it should be noted that – after the return of trams in 2015 – Olsztyn has been developing the rail network in line with strategic assumptions, which include the gradual transfer of transport work from buses to trams in corridors with the highest demand.

Such a situation is hardly surprising, as trams generated a noticeable increase in the number of passengers already in their first full year of operation, and their share in total transport reached approximately 15% compared to the previous year. In Chart 2, which shows the long-term dynamics of public transport passenger numbers in Olsztyn from 2000 to 2024, a clear upward trend is evident. Moreover, the data clearly show that the city's public transport system has undergone significant fluctuations, which can be linked to two strategic actions: the optimization of the route network in 2005 and – as already mentioned – the reactivation of trams in 2015, which was the most important change in the history of modern urban transport in Olsztyn.

At the beginning of the analyzed period (2000-2003), the number of transported passengers remained relatively high. Subsequently (2004-2005), a gradual decline in public transport use became evident, reflecting a nationwide trend of increasing individual motorization and suburbanization. In 2005, the city undertook an optimization of the transport network, which included, among other actions:

- reducing redundant and overlapping routes,
- improving service frequency,
- shortening travel times,
- adjusting the route layout to actual passenger flows.

According to transport data, the measures taken halted the decline and reversed the trend, leading to apparent stabilization and an increase in the number of passengers transported in the years immediately following the network optimization. The chart shows this effect as the first rebound after the prior decline in 2006.

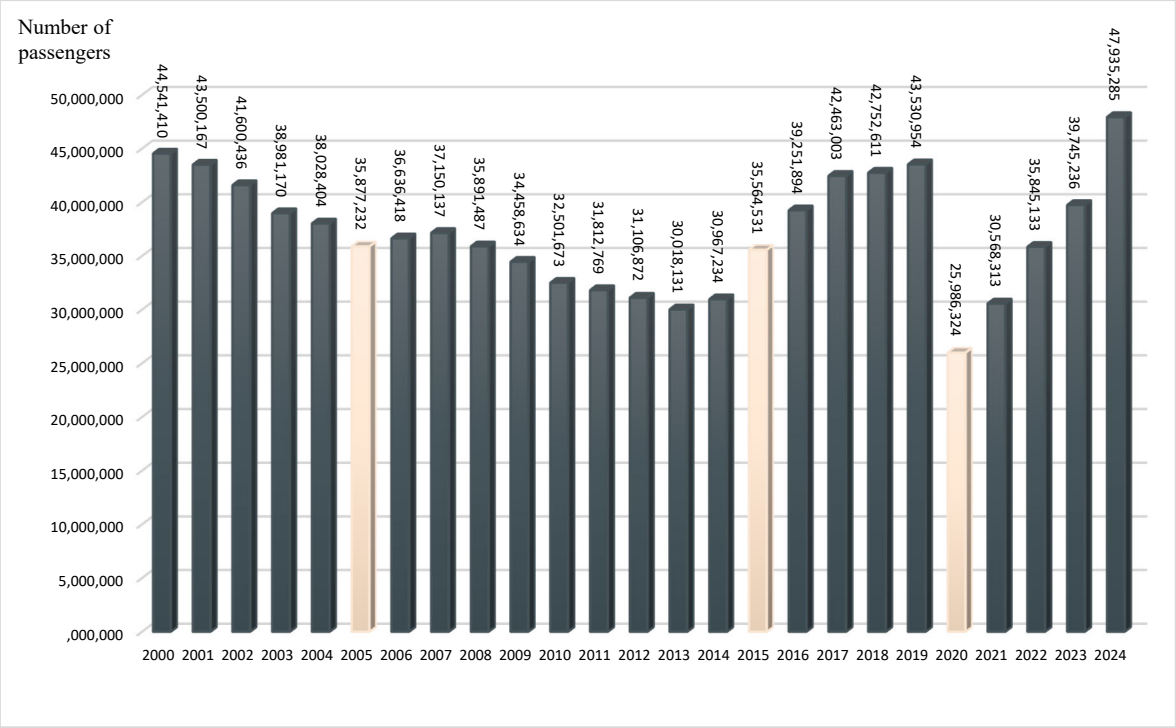

Fig. 2. Number of passengers transported in Olsztyn public transport

Despite the positive effects of optimization, the number of passengers began to decline again in the following years (2008-2014). Practice showed that point-based modernization measures were not sufficient to stop the long-term outflow of passengers from public transport in a city lacking attractive rail-based transit options. The literature indicates that this is typical of medium-sized cities, where private transport has gained an advantage over public transport. In the following years, the number of passengers gradually decreased, although not very rapidly.

In the period 2016-2019, the number of passengers either increased or remained stable. It was only the COVID-19 pandemic in 2020 that caused a sharp, temporary drop in ridership. This trend was global in nature – the decline is visible in the chart.

After the pandemic, passenger numbers began to rise again, and key actions by the authorities – the launch of new tram lines (4 and 5) and the introduction of free travel for students – led to a record result. City data indicate that in 2024, public transport in Olsztyn carried around 47.9 million passengers – 21% more than in the previous year. This significant increase in demand results mainly from the expansion of tram infrastructure, which has greatly improved the spatial accessibility of public transport and increased its attractiveness compared to private transport. An apparent spike in values can be seen on the chart, representing the culmination of long-term modernization efforts. In this respect, Olsztyn is one of the more interesting examples in Poland, where investments in rail transport have led to a lasting reversal of the trend in passenger numbers, reaching historic highs in recent years.

The assessment of public transport in Olsztyn is complemented by an overview of the expenditures related to its operation. Chart 3 presents the long-term dynamics of key economic parameters concerning ticket revenues, spending on the provision of transport services, and the share of fare revenues in covering the costs of public transport.

The analysed period spans more than two decades, enabling the capture of both short-term economic fluctuations and more profound structural changes in the financing of transport services. Over the long term, ticket revenues show a systematic nominal increase. Throughout the examined years, this growth has been relatively stable, which can be linked both to a rising number of passengers and to periodic adjustments of the fare system in response to inflation and increasing operating costs. In recent years, the rise in the number of passengers carried has been particularly pronounced, reaching record levels.

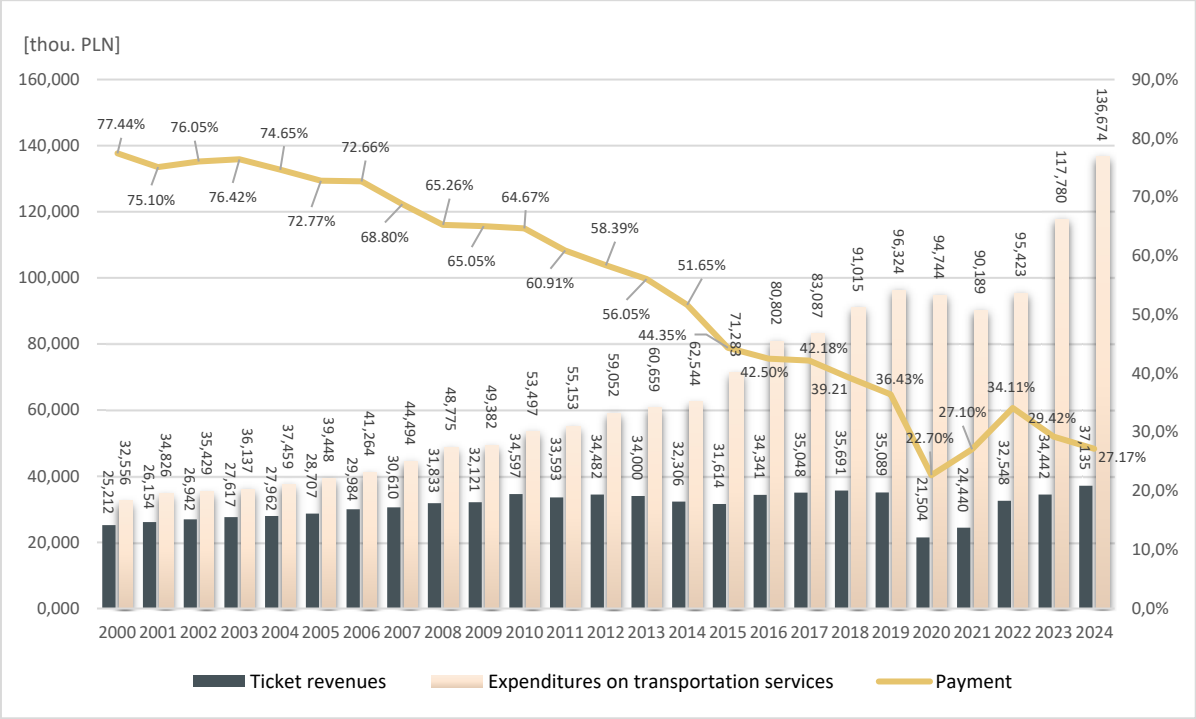

Fig. 3. Economic and financial efficiency of urban transport in Olsztyn

On the other hand, expenditure on transport services shows an upward trend with a clearly higher dynamic than ticket revenues. The increase in costs is the result of several factors: rising energy and fuel prices, higher labour, maintenance, and fleet renewal costs, as well as the consequences of infrastructure investments, which – although they improve service quality – sometimes generate substantial operating expenses. It should also be noted that the expansion of transport services, increased service frequency, and the introduction of more expensive yet environmentally friendly and modern transport technologies are all elements of a sustainable urban mobility development strategy. In the case of Olsztyn, the expansion of the tram network, the modernisation of the bus fleet, and the implementation of traffic management systems and public transport priority measures have improved service quality but also increased overall system maintenance costs.

Consequently, the relationship between ticket revenues and total expenditure on transport services has been gradually deteriorating. In the early years of the analysis, the farebox recovery ratio exceeded 70%, indicating a relatively high level of self-financing of the system. Over time, this ratio systematically declined, reaching

30-40% in recent years. The declining share of fare revenues in public transport operating costs means a growing need for public funding, a phenomenon also observed in other Polish and European cities. The literature emphasises that a high level of subsidies for transport services is an inherent element of transport policy aimed at sustainable development, emission reduction, and limiting car traffic. Subsidising public transport is justified by its positive external effects, such as reduced congestion, improved spatial accessibility, and a lower environmental impact.

Changes in fare policy have also contributed to the decline in the farebox recovery rate. The introduction in Olsztyn of free travel for students up to the age of 19, the expansion of concessions for specific social groups, and the promotion of long-term tickets increase mobility but simultaneously reduce actual fare revenues. According to municipal data, in 2024 more than 6.1 million single- and short-term tickets were sold, along with nearly 268,000 season tickets, generating revenues of 37.14 million PLN. Although the increase in ticket sales is significant, it does not offset the rising operating costs resulting from the expansion and intensification of the system's functioning.

The analysis indicates significant structural changes in the financing of public transport in Olsztyn. The system is becoming increasingly widespread and heavily used, which is reflected in the growing number of passengers. At the same time, it requires increasing support from public funds. From an economic perspective, the decreasing level of self-financing of public transport should be interpreted in a multifaceted way. It may indicate the effective implementation of policies promoting public transport and encouraging a shift away from private vehicles, while also highlighting the need for financial instruments to ensure the system's stability.

In conclusion, further research should include analyses of the unit costs of transport services and assessments of system productivity in terms of vehicle-kilometres, the efficiency of infrastructure investments, and the relationship between fare policy and the elasticity of demand for transport services. It would also be advisable to extend the analysis to include the impact of qualitative changes – such as the development of the tram network, fare and ticketing integration, and the implementation of ITS solutions – on residents' mobility behaviours. Such an approach would enable a more comprehensive assessment of the public transport system's functioning and support the formulation of conclusions relevant to the strategic planning of urban mobility.

5. Demand Management in Olsztyn's Public Transport

The public transport system in Olsztyn has, for many years, been an important element of public debate, being one of the key factors shaping the quality of life of residents and the sustainable development of the city. For a long time, Olsztyn was regarded as an example of a local government that consistently invests in modern, environmentally friendly, and accessible public transport. The implementation of two major tram projects, the expansion of infrastructure, the purchase of modern rolling stock, and the introduction of bus lanes and tram-bus lanes have significantly improved residents' mobility and contributed to the revitalization of urban space (Ejdys 2023).

However, after years of intensive development, we are now observing a clear shift in the city's transport policy. In 2025, Olsztyn decided to reduce the number of bus and tram services, which in practice means a reduction in the public transport offer. This phenomenon – referred to as demand suppression – may lead to a decline in the attractiveness of public transport, longer waiting times, and a shift of passengers toward individual means of transport.

The case of Olsztyn is an interesting example of the complex relationships between local government policy, external funding, and the pursuit of sustainable mobility goals. It shows how changes in investment priorities, rising operational costs, or instability in political decision-making can lead to a slowdown in the development of a low-emission public transport system.

From an industry perspective, Olsztyn thus represents a model case of the collision between two mobility-management logics:

- Strategic, aimed at permanently reducing the demand for individual transport and improving the quality and efficiency of public transport. Olsztyn's strategic documents—particularly the Sustainable Urban Mobility Plan (SUMP) for the Municipal Functional Area—show alignment with this approach.
- Operational, forced by ongoing financial and staffing constraints, consequently leading to a reduction in the supply of transport services and a potential decline in interest in public transport.

The conducted study enabled a comprehensive identification and analysis of the mechanisms shaping demand in the public transport system of Olsztyn in the years 2000-2024. The results indicate that, despite clear declarations contained in strategic documents – assuming the development of public transport and the limitation of demand for individual motorised transport – actual operational practice in recent years has been domi-

nated by cost-saving and reactive measures. Consequently, symptoms of processes leading to unintended reductions in demand for public transport services have emerged, described in public debate as "demand suppression". This phenomenon – although previously discussed in the context of regional railways and selected urban transport systems – was in 2025 applied to the urban transport system in Olsztyn, both by journalists and some local commentators (Kurs 2025).

The analysis results show a clear discrepancy between the declared strategic goals of Olsztyn and the direction of operational actions in the field of public transport. In line with the assumptions of European mobility policy, demand-management instruments should form part of an integrated transport policy aimed at reducing undesirable trips while simultaneously increasing the availability of alternatives (Litman 2021, Banister 2008). A similar approach is presented in the Olsztyn Functional Area Sustainable Urban Mobility Plan, which assumes strengthening the role of public transport and limiting the dominance of private cars (Olsztyn City Hall 2023). However, the analysis of available data and administrative decisions indicates that actual actions take the form of selective reductions in the supply of transport services.

The contradiction between strategic documents and implemented decisions becomes particularly evident in the case of projects co-financed with EU funds. Abandoning part of the tramway investments or reducing the vehicle fleet – despite the availability of external funding – remains inconsistent with the development directions recommended by the European Commission (European Commission, 2020). The literature emphasises that inconsistent implementation of low-emission urban transport projects has direct consequences for emissions and transport accessibility. As a result, Olsztyn is exposed to weakening long-term transport cohesion and the loss of the potential to build a mobility system consistent with the principles of sustainable urban mobility. The main reasons indicated include a shift in priorities (greater emphasis on education, thermal modernisation of schools, and the construction of nurseries), rising operating costs of public transport, and uncertainty regarding EU funds.

From the perspective of public transport demand, the consequences are multidimensional:

- the lack of new trams and the suspension of some infrastructure investments mean that the system's limited capacity will be maintained. With a growing number of passengers, vehicle overcrowding becomes more likely, and travel comfort decreases, which in the literature is considered a "soft" form of demand limitation;
- reducing the planned number of electric buses from 20 to 11 limits the ability to strengthen the service offer on new or overloaded routes.

At the same time, comments are appearing on the "OlsztyńskieTramwaje" blog about "bad times for trams," pointing to the dissolution of tram teams at the city hall and signs of a lack of political will to expand the network further. Combined with reports of record-breaking ridership on Olsztyn's public transport system, this suggests a situation in which demand is growing faster than the system can handle.

As a consequence, this leads to a dominance of supply-side measures, such as reducing the number of services or limiting the scope of investments. These actions fall within a type of demand management described in the literature as an approach with a high risk of adverse effects (Taylor & Fink 2013). A reduction in supply without adequate development of alternative forms of mobility may result in a lasting decline in the attractiveness of public transport (Currie & Delbosc 2011). Research indicates that decreasing service frequency is one of the strongest factors deterring passengers and contributing to an increase in the share of individual transport. In the context of Olsztyn, where the insufficient quality of pedestrian and cycling infrastructure had already been highlighted (Committee of the Regions, 2020), this risk appears particularly significant.

At the same time, it was found that suburbanisation processes characteristic of Olsztyn further weaken the effectiveness of the public transport system by generating high demand for forced travel and fostering motorisation trends. In this context, constraints in the supply of public transport services deepen inequalities in access to mobility and worsen the territorial cohesion of the area.

The study's findings also emphasise the vital role of systemic factors such as rising operating costs, staff shortages, fleet limitations, and crisis episodes (e.g., the cyberattack on ZDZiT in Olsztyn), which significantly affected the city's ability to maintain a stable level of service. These factors, although often beyond the control of local authorities, intensified the pressure to reduce transport work, reinforcing mechanisms that lead to a decrease in demand. From the perspective of urban mobility research, these actions are particularly important because they address the relationship between strategic planning and the actual shaping of demand under systemic constraints.

The analysis of operational data also revealed a declining trend in service supply, which became particularly concerning after 2020. Reductions in service frequency, a decrease in the number of routes on peripheral and suburban lines, and investment delays resulted in diminished attractiveness of public transport. These

findings are consistent with the "downward spiral" mechanisms described in the literature, in which reductions in supply lead to further declines in demand and to the erosion of system stability.

The most direct manifestation of demand reduction is the decrease in the supply of transport services. Since early 2025, the city has introduced significant changes to the network structure and timetables. Several lines have been withdrawn or modified, and the frequency of both tram and bus services has been reduced. (Portal samorządowy, 2025, ZDZiT, 2025a) As a result, passengers have to contend with longer travel times, the need to transfer, or the lack of convenient connections, which in effect reduces the attractiveness of the offer (Kurs 2025).

At the same time, ZDZiT documentation indicates adjustments to routes and the line layout, for example, replacing the existing line 309 with the new line 119, as well as discontinuing line 116, whose functions have been taken over by line 101. (ZDZiT, 2025b) Although municipal statements justify these changes with "capacity analysis" and cost optimisation, from the user's perspective, they mean a deterioration in transport accessibility.

Additionally, it should be noted that the decreasing share of public transport in urban travel represents a clear departure from the assumptions of the SUMP and from the goals of European policies aimed at climate neutrality and emissions reduction.

Moreover, the interpretation of the analysed material also indicates the growing role of social perception in the processes shaping demand. In recent years, critical narratives have dominated media coverage, emphasising a decline in service quality, which may have contributed to a lasting decrease in trust in the public transport system. This phenomenon is consistent with findings in the literature, which indicate that in medium-sized cities the image of transport services has a powerful impact on residents' travel behaviour.

In summary, the research results show that Olsztyn is an example of a city in which the discrepancy between strategic planning and actual operational actions leads to a reduction in demand for public transport, despite declared efforts to achieve sustainable mobility. The findings highlight the need for systemic organisational, integrative, and financial interventions, as well as the necessity of restoring stability in service supply as a prerequisite for halting or reversing the processes of "demand suppression."

6. Summary

The article analyzes the demand management policy for transportation in Olsztyn in the years 2000-2024, placing it within the context of sustainable mobility, which is one of the key elements of environmental protection in urban policy. The content clearly indicates that public transport – especially low-emission transport – plays a fundamental role in reducing the negative impact of transportation on the climate, air quality, and the urban landscape.

The study highlights that the city's strategic plans, such as the Sustainable Urban Mobility Plan, assume a reduction in car traffic and the promotion of environmentally friendly mobility, including a greater role for public transport and improved integration of pedestrian and bicycle transportation. However, the analysis reveals a significant discrepancy between the assumptions of pro-environmental policy and the operational practices of recent years: instead of strengthening the public transport offer, numerous cuts were introduced in the number of services, reducing line frequency and limiting the potential to shift journeys from cars to public transport further. The authors point out that such practices lead to a phenomenon of "demand suppression," which may ultimately weaken the environmental benefits of previous investments and increase environmental pressure through a growing share of car travel.

The article also notes that a lack of consistency in the implementation of EU co-funded projects – including reduced purchases of modern electric rolling stock – may negatively affect long-term emission reductions. It emphasizes that maintaining a stable and attractive public transport offer is crucial for environmental protection, as public transport is the primary instrument for reducing emissions, noise, and congestion. The authors also highlight that sustainable mobility development requires not only infrastructural investments but also consistent demand management aimed at reducing excessive car traffic and decreasing the pressure of transportation on the climate and the quality of life in the city.

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