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# Traffic restrictions as a way to reduce the level of car-centricity of the city

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**Abstract.** Modern cities are overloaded with cars, so progressive administrators are shifting their focus towards optimising traffic flow, reducing delays, improving road safety and creating comfortable conditions for pedestrians and public transport users, including by restricting traffic in city centres. The aim of this study was to analyse the measures implemented in European cities to reduce traffic congestion in city centres, as well as the results they have achieved. The article analysed modern traffic management methods used in European cities (Barcelona, Madrid, Paris, Stockholm) and New York, and identifies their advantages, problematic aspects of implementation, and potential impact on the further development of urban mobility. Based on the results of the work, it was determined that a considerable number of European cities have adopted a shift from a car-centric urban planning model to one that prioritises population mobility. This transition has been accompanied by a notable increase in the infrastructure dedicated to pedestrian and bicycle traffic. The systematic increase in dependence on cars has led to the expected consequences – exceeding the capacity of the built road network, resulted in a high number of concentrated traffic jams, and increased emissions of hazardous substances. To combat the consequences of congestion in cities, especially in central areas, a number of countries have implemented restrictions related to both a complete traffic ban and financial payments for travel in selected areas. The long-standing and recently introduced restrictions have had a clear impact on reducing traffic in selected areas, thereby decreasing travel time and $CO_2$ emissions. The practical value of this work lies in the fact that it provides an opportunity to develop and implement effective solutions to reduce traffic congestion in central Kyiv, based on the successful experience of European cities

**Keywords:** traffic management; road traffic safety; congestion; urban mobility; ecology

## Introduction

The evolution of urban landscapes and the establishment of their street and road networks occurred in tandem with the increasing adoption of motorised vehicles. However, the pace of this process exceeded expectations, and at the beginning of the 21st century, cities faced new challenges such as congested roads, traffic jams, parking shortages, and a deteriorating urban environment. Traditional approaches to transportation planning that focus on private cars no longer ensure the efficient functioning of urban infrastructure. On the contrary, they only exacerbate existing problems. Therefore, modern cities are focusing on optimising traffic flows, reducing delays, improving traffic

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safety, and creating comfortable conditions for pedestrians and public transport. Rational management of the street and road network is a key factor for the balanced development of urban transport. Its goal is to ensure uninterrupted transport links between functional areas of the city and to create a comfortable and safe urban space. The high level of transportation delays, congestion that causes increased travel time, deterioration in the level of transportation services, and an increase in the number of traffic accidents indicate that the city's street and road network does not correspond to the number of cars on it. K. Cao *et al.* (2024) showed that the main causes of delays in central areas are the uneven distribution of traffic flows and suboptimal traffic management, while network optimisation and signal control adjustments can significantly reduce congestion. In order to create a comfortable and environmentally friendly environment for city residents, European countries have been implementing measures to restrict car traffic for decades. The main goal was to reduce street congestion, emissions of harmful substances, improve safety for pedestrians and drivers, and encourage the use of public transport and bicycles. Y. Matseliukh *et al.* (2025) proved that the development of public transport and the integration of digital solutions in a "smart city" substantially decrease emissions and reduce the share of private car use. Because a large number of jobs and major activity centres are located in city centres, and street networks are limited in capacity, many countries impose restrictions on car use in central areas while enhancing mobility through the creation of pedestrian zones and bicycle lanes. This article examined the methods of car traffic restriction applied in European cities, identified the challenges arising during their implementation, and analysed how such measures may influence the future of urban mobility. F. Tassinari (2024), using the example of the Madrid Central zone, confirmed that low-emission zones (LEZs) have a strong deterrent effect on private vehicle usage and help reduce air pollution. The systematic review by Y. Ma & F. Mészáros (2024) indicated that access-restriction measures – such as traffic bans, LEZs, and pedestrian zones – consistently demonstrate high effectiveness in improving the sustainability of urban logistics. H. Billhardt *et al.* (2022) proposed a model of dynamic access regulation to the city centre based on congestion levels, which enhances infrastructure efficiency and reduces traffic volumes. S. Li *et al.* (2020) showed that congestion charging combined with spatial pricing in ride-sourcing services can significantly reduce private car trips. Urban vehicle access regulations (n.d.) identified the most effective tools for decreasing city-centre car use, including congestion charging, reducing parking supply, and developing cycling and pedestrian infrastructure. According to the Smart cities mobility index (n.d.) report, the most promising direction for Central and Eastern European cities (including Kyiv) is the integration of multimodal mobility with a strong prioritisation of public transport. Finally, J. Palaguachi *et al.* (2024) demonstrated that incentivising the use of peripheral park-and-ride facilities within a managed system can substantially reduce traffic pressure in central urban zones. Collectively, these studies highlight the effectiveness of a comprehensive policy approach – combining restrictive measures, public transport development, and rethinking urban space – as the key strategy for relieving congestion in major city centres. This study sought to examine the strategies adopted by European cities to alleviate congestion in central urban areas and to assess the outcomes of their implementation.

## Materials and Methods

The methodological foundation of the study was a systematic review of the academic literature aimed at synthesising theoretical and applied approaches to restricting vehicular traffic in city centres and assessing their impact on urban mobility. The development of the theoretical framework involved the purposeful selection and systematisation of contemporary and relevant sources reflecting the current state of academic debate and governance practice. The analysis drew upon publications indexed in international scholarly databases (ResearchGate, Web of Science, Academia.edu), as well as official materials produced by municipal authorities and international organisations. Sources were selected according to the following criteria: thematic relevance to traffic restriction policies in city centres; the presence of empirical or analytical findings; and a focus on large and medium-sized cities as representative settings for the implementation of transport innovations. This ensured the relevance and comparability of the findings obtained. In particular, publications by N. Mueller *et al.* (2020), E. Natterer *et al.* (2024) and K. Pérez *et al.* (2025), devoted to examining the impact of urban design and traffic organisation on the environment and public health, were analysed. In addition, materials from the information resources Superblocks of Barcelona (2024), Urban vehicle access regulations (n.d.), and Which cars can drive… (n.d.) were utilised as sources of up-to-date data on the practical implementation of traffic restrictions and the functioning of the respective initiatives. The analytical stage of the research was based on a combination of the comparative approach and content analysis, which made it possible to identify key instruments of urban traffic regulation (pedestrianisation, LEZs, congestion charging, and parking regulation) and to assess their effectiveness in terms of reducing traffic congestion, improving air quality, and enhancing the sustainability of the urban environment.

The empirical component was formed using the case study method, which involved an in-depth examination of traffic management practices in leading cities in Europe and the United States (US). Specifically, the experiences of implementing vehicular traffic restrictions and LEZs in Barcelona, Madrid, Paris, Stockholm, and New York were analysed. The inclusion of New York as a non-European metropolis that has recently introduced a congestion pricing system enabled an interregional comparison between European regulatory models and contemporary practices in the US. Additionally, cartographic analysis was applied, encompassing the examination of traffic restriction zone schemes, superblocks, and congestion charging areas. This made it possible to assess the spatial configuration of transport solutions and their integration into the overall structure of urban planning. The combination of the methods employed ensured the comprehensiveness of the study and the validity of the conclusions drawn.

## Results and Discussion

More and more cities, especially in Europe, are financially restricting or banning vehicle traffic in the city centre. Measures to regulate the price of car use in cities exist in all EU countries. London has been charging for entry into the city centre for more than 15 years. In addition, the city has several other taxation zones for toxic emissions. In Stockholm, such a system has been in place since 2007. However, the earliest to collect fees for entering the city centre was Singapore in 1975 (Why is paid entry to central…, 2018; FHWA primers and one-page, n.d.). The two main reasons for the restrictions are street congestion and air pollution from car emissions. Safe and, above all, efficient transport operation directly depends on improving the state regulation of its activities, and to gain the experience, Ukraine can look up to the world's leading countries, where this issue has been resolved most effectively. An analysis of selected European cities that have introduced comparable restrictions is undertaken to evaluate the effectiveness of the policy decisions implemented. One of the best decisions in urban planning is the Barcelona's superblocks, which aim to reduce noise and air pollution in urban areas. The concept is consolidation of nine standard districts into one superblock, where traffic is allowed only on peripheral roads and access to the centre is restricted except for superblock residents and service vehicles (Mueller *et al.*, 2020). Layout like this leaves much more space for pedestrians, cyclists, parks, playgrounds and recreation areas. Since the 19th century, the city has been built according to a concept of superblocks created by I. Serda (Pérez *et al.*, 2025). Modern superblocks even give a second life to this concept by limiting car traffic and encouraging the expansion of green areas and pedestrian mobility. The first modern superblock was introduced in 2016. The introduction of superblocks has brought social and economic changes. As parts of the streets became pedestrianised, real estate prices increased, and a large number of cafes, restaurants, and hotels replaced local shops. Because of the superblock, pedestrian and cycling activity increased by 10% and 30% respectively, pollution was significantly reduced, and the urban environment became more attractive to residents and visitors alike. Therefore, the Barcelona city authorities considered these factors when planning the city's future Superblocks of Barcelona (2024). Figure 1 illustrates the differences between the superblock concept under unrestricted conditions and when access to the city centre is limited.

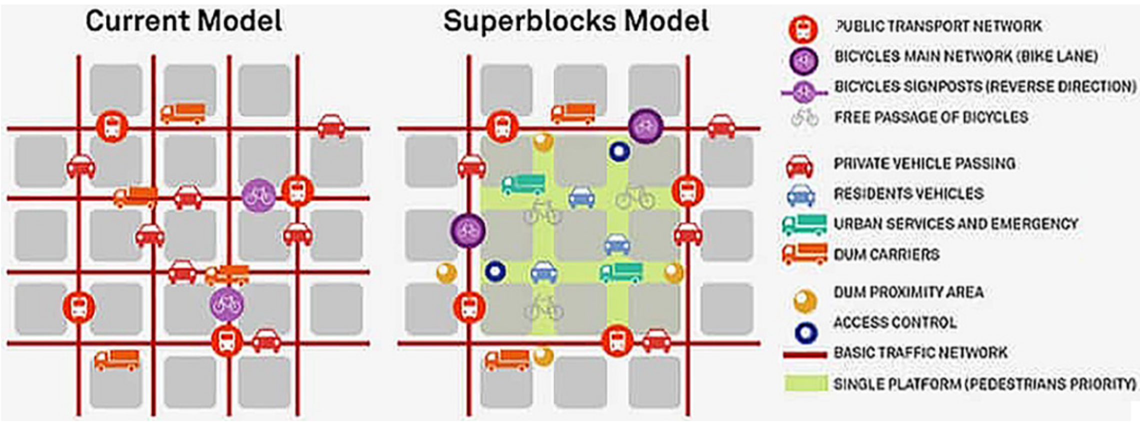


**Figure 1.** Comparison of the concept of superblocks without restrictions and with restrictions on access to the centre
**Source:** Superblocks of Barcelona (2024)

Figure 1 shows comparison of current model of street planning. At the current model, cars, vans, trucks and buses can use every street with no restrictions. At the superblock model 3 blocks are combined in one, and inside the block streets can be used only by local residents. The Madrid Central programme was introduced in November 2018 to reduce air pollution and improve the quality of life of residents by restricting car traffic in the central part of Madrid. Madrid is one of the first cities to restrict traffic and create pedestrian zones. In 2005, the city of Madrid established a priority pedestrian zone in the densely populated historic district of Las Letras, and subsequently implemented similar initiatives in several other areas of the city. Since 2018, the 472-hectare zone has been closed to most vehicles, with the exception of hybrid and electric vehicles, as well as vehicles of local residents and guests with special permits (Which cars can drive…, n.d.). Even in a country where many cities restrict the movement of private vehicles, this is a radical restriction. While most of Madrid's streets are very narrow and not very suitable for motorised vehicles, the designated central zone has wide roads that are filled with a large flow of cars every day. Thus, the plan is not only to make the busy central streets more comfortable for pedestrians and tourists, but also to demotivate residents of the capital from driving to the central part of the city. According to the Federation of European Transport and Environment, Madrid Central has become the most effective LEZ programme among European cities, achieving a 32% reduction in nitrogen dioxide pollution) (Madrid's low emission zone…, 2019). In 2021, the city government adopted a new environmental strategy called Madrid 360 (n.d.), which are similar to Madrid Central but have some differences. In particular, more rights were granted to local entrepreneurs, equating them to residents in terms of access to the zone, and restrictions on certain trucks were postponed. Beginning in 2025, the restrictions for vehicles with the "B"-Eco label will be strengthened (Madrid Central: How to… n.d.). These vehicles will only be able to drive in LEZs under certain conditions, such as parking in regulated car parks or being a resident. These measures aim to further improve air quality and provide a healthier urban environment for Madrid's residents (Madrid 360, n.d.). Figure 2 demonstrates the spatial coverage of the restricted traffic zone in central Madrid, indicating the boundaries and the area where traffic restrictions apply.

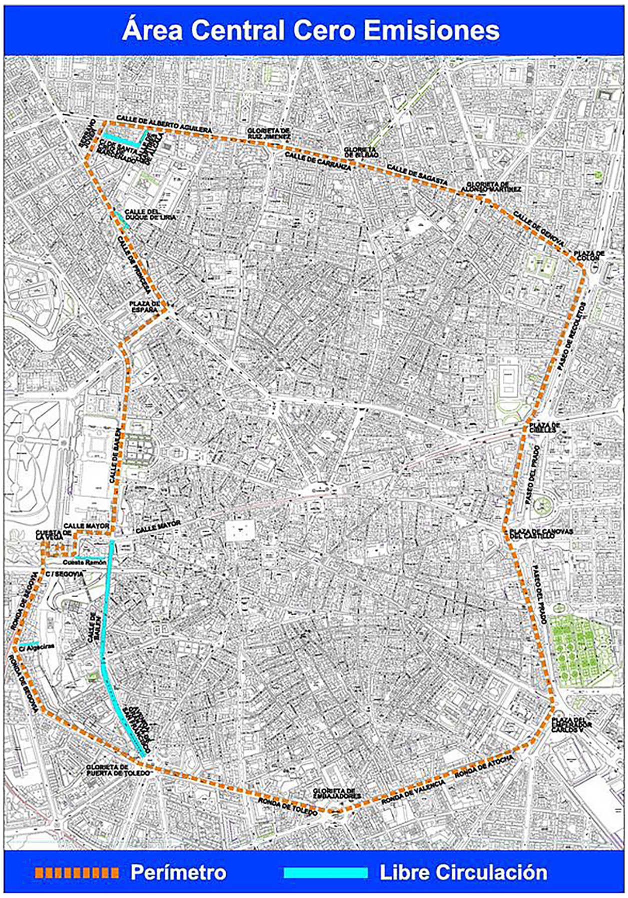


**Figure 2.** Madrid Central programme area in the city of Madrid
**Source:** Residents of central Madrid… (2018)

Figure 2 illustrates Madrid Central – a large Residential Priority Area covering 470 ha, aimed at reducing through traffic and lowering $NO_2$ emissions by up to 40%. Residents can freely use their vehicles and issue a limited number of guest passes, while non-residents are allowed access only with an environmental badge or a guest pass. Taxis and ride-hailing services (e.g., Cabify, Uber) have special access rules until 2025, after which free circulation will be permitted only for vehicles with a CERO (zero-emission) or ECO (hybrid/low-emission) environmental label.

Paris is actively implementing measures to restrict traffic in central areas, creating safe zones for pedestrians and cyclists to improve air quality and reduce noise pollution. On 5 November 2024, the city of Paris introduced the first ZTL in the city's central districts, covering the $1^{st}$ to $4^{th}$ arrondissements (Le Monde, 2024; Natterer *et al.*, 2024). This zone strictly limits the entry of motorised vehicles, giving priority to pedestrians and cyclists. The aim of this initiative is to improve air quality, reduce noise and traffic, and return public space to residents. The area is home to about 100,000 people and 11,000 companies. Only emergency services, buses, taxis, people with reduced mobility, locals, employees, and visitors with specific purposes such as medical visits or shopping are allowed to access the ZTL. According to data from City Hall, the number of vehicles entering the ZTL daily ranges from 350,000 to 500,000, with up to 50% of these vehicles belonging to through traffic. Through traffic is defined as drivers who are merely passing through but have a final destination outside the ZTL. Authorities anticipate that the implementation of the restricted ZTL will result in a substantial reduction in vehicular traffic, potentially up to 30% on the busiest thoroughfares, including Boulevard de Sébastopol and Avenue de l'Opéra, accompanied by decreased noise levels and improved air quality (Poulhès *et al.*, 2025). These measures underline Paris's commitment to creating a more pedestrian and cycling-friendly urban environment, reducing reliance on private transport and improving the overall quality of life for residents. Traffic restrictions in areas of Paris are shown in Figure 3. Figure 3 illustrates the area designated as a restricted traffic zone in Paris, located along the banks of the Seine, with the lower image providing a comparison between this zone and the rest of the city. The introduction of the restricted traffic zone has produced measurable outcomes. Traffic volumes along the boundaries of the zone decreased substantially, with an 18% reduction observed in 2008 compared to 2005, prior to the implementation of the entry fee. The adoption of environmentally friendly vehicles increased during the trial period, rising from 3% of trips using alternative fuel vehicles to 13% by 2008. In addition, $CO_2$ emissions from vehicles in the city centre were reduced by an estimated 14-18% following the introduction of the congestion charge (What are city road taxes?, n.d.). These results indicate that the implementation of a restricted traffic zone can effectively reduce traffic congestion, promote the adoption of environmentally friendly vehicles, and contribute to a measurable decrease in urban $CO_2$ emissions.

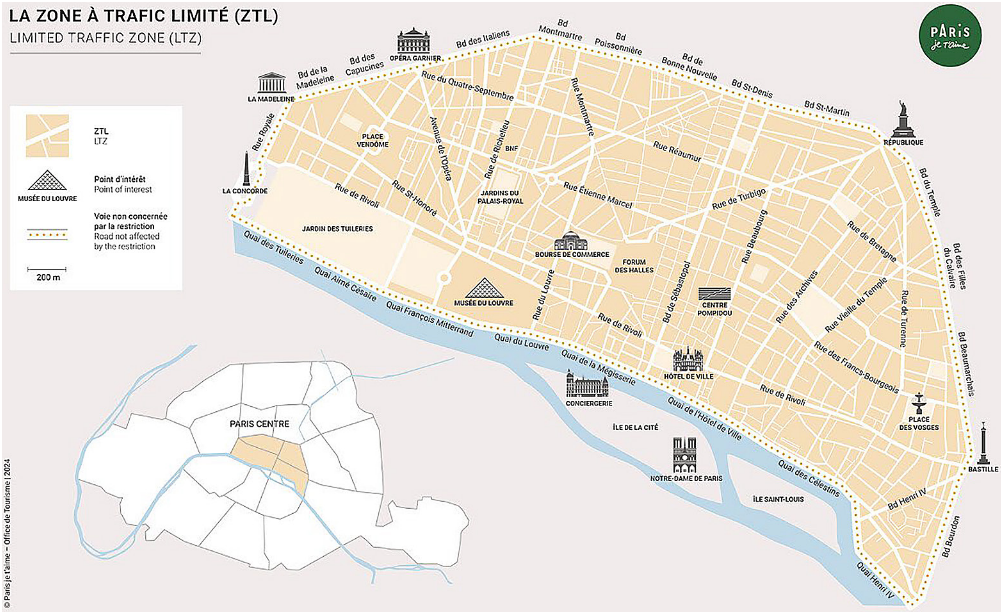


**Figure 3.** Boundaries of the Paris restricted traffic zone

**Source:** Limited traffic zone in Paris (2025)

In 2007, Stockholm introduced a system of fees for entering the central part of the city, known as congestion tax, in order to reduce congestion and improve air quality. The city's residents voted to approve this initiative. Initially, this tax applied only to vehicles registered in Sweden. As of January 1, 2015, the tax applies to vehicles with both Swedish and foreign registration plates, as noted by A. Vadeby & Å. Forsman (2018). The congestion tax is levied on cars, trucks, and buses with a total weight of less than 14 tons. Motorcycles and mopeds are exempt from this tax. The amount of the charge depends on the day of the week and the time of day. The tax is applied to vehicles between 6:00 a.m. and 6:29 p.m., Monday through Friday. No charge is applied on Saturdays, Sundays, public holidays, or the eve of public holidays. The tax is also not applied in July. The maximum daily charge per vehicle is SEK 135 during the high season and SEK 105 during the low season. High season runs from 1 March to early July (including the first five working days of July) and from 15 August to 30 November, while low season covers the remaining period (Sweden, n.d.). Figure 4 presents the layout of traffic restrictions and the locations of control points in Stockholm.

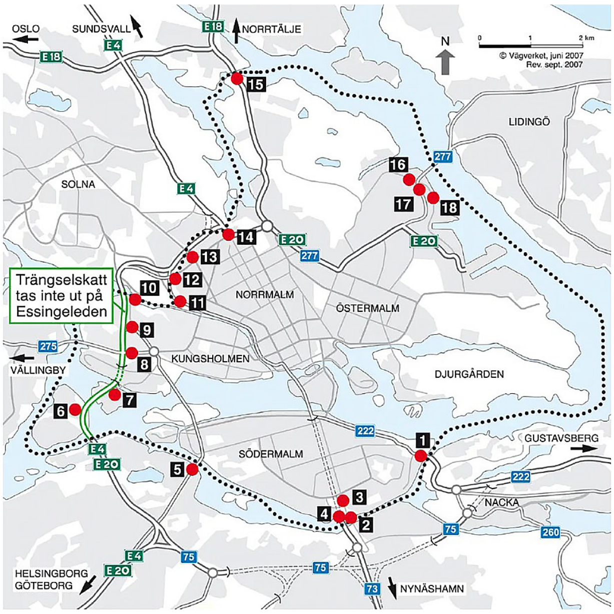


**Figure 4.** Stockholm's limited traffic zone

**Source:** Sweden (n.d.)

Figure 4 depicts the extent of the limited traffic zone in Stockholm. Compared to the restricted traffic zone in Paris, the Stockholm zone differs in size and regulatory approach: while Paris strictly limits the entry of motorised vehicles, entry in Stockholm is permitted subject to a congestion charge. The implementation of these measures has contributed to improved air quality and reduced traffic congestion, positively affecting the urban environment and residents' quality of life. The congestion tax in Stockholm remains in force as of 2025, applying to vehicles entering both the city centre and the Essingeleden highway during specified hours.

New York (US) was included for interregional comparison, as previously studied examples only concerned European cities. In 2025, a congestion charging system was introduced in central areas to reduce traffic congestion, improve air quality and provide additional funding for public transport, integrated into a sustainable urban transport infrastructure strategy. Tolls, or a system of charging for entry into the city's central areas, were introduced in New York City to reduce congestion, improve air quality, and provide additional funding for public transportation. The initiative was part of the city's broader strategy for sustainable development and modernisation of its transportation infrastructure, as noted by R. Khalifeh & S. Nessen (2025). The fare was introduced by the MTA on January 5. Under the tolling scheme south of 60th Street in Manhattan, passenger and small commercial vehicles are charged $15 during peak hours and $3.75 overnight, while motorcycles incur fees of $7.50 and $1.75, respectively. Trucks and buses are charged either $24 or $36 during peak hours and $6 or $9 overnight, depending on vehicle type. Discounts are applied for drivers using an E-ZPass at the four tolled entry points in the zone – the Lincoln Tunnel, Holland Tunnel, Queens-Midtown Tunnel, and Hugh L. Carey Tunnel – with credits of $5 for passenger vehicles, $2.50 for motorcycles, up to $12 for small trucks and charter buses, and up to $20 for large trucks and tour buses. No credits are offered during the discounted overnight period (Khalifeh & Nessen, 2025). Following the introduction of the congestion fees on January 5, initial data from the Metropolitan Transportation Authority indicated a 7% reduction in the number of vehicles entering the tolling zone south of 60th Street compared with the same period in the previous year. This decrease contributed to faster traffic flow in surrounding areas, with average trip times falling by 10-30% during the first days of implementation, even accounting for days with atypical disruptions. In particular, average weekday travel times through the Holland Tunnel declined by 48% during the first three weeks of congestion pricing relative to the same period in January of the preceding year. Travel times on the Williamsburg Bridge fell 30% and 27% on notoriously jammed Canal Street, according to J. Zanger *et al.* (2024). Figure 5 shows the central part of New York City and the boundaries of the congestion charging zone.


**Figure 5.** Congestion tax zone in New York City

**Source:** J. Zanger *et al.* (2024)

Figure 5 illustrates the congestion charging zone in Manhattan, New York, which is bounded by 60th Street to the north and major transport arteries and bridges around its perimeter. It visualises the geographical limits of the zone where the congestion charge applies, highlighting the locations of key entry points and tunnels through which vehicles enter the city centre. Consequently, a considerable number of European cities have adopted a shift from a car-centric urban planning model to one that prioritises population mobility. This transition has been accompanied by a notable increase in the infrastructure dedicated to pedestrian and bicycle traffic. The systematic increase in dependence on cars has led to the expected consequences – exceeding the capacity of the built road network, resulted in a high number of concentrated traffic jams, and increased emissions of hazardous substances. To combat the consequences of congestion in cities, especially in central areas, a number of countries have implemented restrictions related to both a complete traffic ban and financial payments for travel in selected areas. Analysed restrictions have had a clear impact on reducing traffic in selected areas, thereby decreasing travel time and $CO_2$ emissions.

Based on the case study and literature review, it can be argued that similar initiatives could be implemented in Ukraine, particularly in Kyiv. According to O. Panchenko (2021), Kyiv ranks seventh in the ranking of the world's cities with the most traffic jams, and a large number of transit trips pass through the main Khreshchatyk Street. Despite the fact that the time spent in traffic jams is increasing year after year, drivers in Ukraine are not ready to give up their cars. Such measures need to take into account the alternatives that the city can offer to residents in exchange for giving up driving, such as high-quality public transportation, pedestrian and bicycle infrastructure. D. Bespalov, the director of ProMobility, says that it is possible to calculate the effect of these restrictions on transportation using a transport model. It can be selected a section of the transportation network and calculate the effect on the toll road if 10%, 20%, or 50% of drivers pay. In other words, if the city authorities want to introduce such toll zones, it will be quite possible to develop a feasibility study for them, which is necessary to allocate funding (Panchenko, 2021). Thus, the introduction of restrictions on car traffic in Kyiv is advisable provided that a comprehensive approach is taken, involving the development of alternative modes of transport and a detailed technical and economic assessment of the impact of such measures on the city's transport system. Other studies emphasised that urban traffic management strategies, including congestion charging and LEZs, play a critical role in reducing car dependency, mitigating congestion, and enhancing environmental quality and public health outcomes. At the same time, they highlight potential economic implications and displacement effects that must be carefully taken into account when designing and implementing effective urban mobility policies. A. Baghestani *et al.* (2020) argued that the introduction of congestion charging in central areas of New York City effectively reduces the number of car trips into the city centre, alleviates congestion and delays, lowers harmful emissions, and encourages greater use of public transport. The authors noted that implementing cordon pricing in New York City could reduce single-occupancy vehicle trips, improve traffic conditions in the Central Business District, decrease congestion and emissions, thereby mitigating negative public health impacts, although the accuracy of results is limited by the model and available data, and further research could include economic and social analyses. The authors also emphasised that such strategies can enhance the overall efficiency of urban transport networks and serve as a reliable decision-making tool for large US cities. According to Y. Li & D. Vignon (2024), the policy of imposing an additional surcharge on ride-hailing trips in New York City led to a decline in trip volumes and service revenues, particularly for short journeys and in areas with alternative transport options. However, it did not reduce congestion, potentially generating short-term economic losses for the city. The study by J. Moral-Carcedo (2024) confirmed that the implementation of the low-emission zone Madrid Central successfully reduced traffic levels in the city centre, yet it also resulted in increased traffic in surrounding districts. This highlights the importance of accounting for displacement effects when designing urban mobility policies. A systematic review by P. Manglano-Redondo *et al.* (2025) demonstrated that dynamic LEZs, which adapt in real time to changing traffic conditions, are effective in reducing air pollution in urban centres. These measures combine environmental objectives with the need to maintain traffic flow, supported by advanced monitoring technologies and traffic-modelling approaches. According to the results of the study, the introduction of such restrictions in European cities demonstrates the effectiveness of the transition from car-centric planning to prioritising population mobility, accompanied by the development of pedestrian and bicycle infrastructure, reduced traffic congestion, shorter travel times and lower $CO_2$ emissions. Thus, the discussion demonstrated that successful transport policies require a balance between environmental benefits, population mobility and possible side effects, such as economic losses or the transfer of traffic congestion to other areas.

## Conclusions

The article reviewed five cities that have introduced traffic restrictions in their city centres through the implementation of LEZs. Although each city differs in terms of the type of restriction applied and the spatial extent of the zone, the overall outcome is consistent: a reduction in harmful emissions and congestion. The findings of the analysis demonstrated that the introduction of such measures has a clear positive effect in reducing transport intensity, alleviating traffic congestion, shortening travel times, and decreasing $CO_2$ emissions as well as other air pollutants. Particularly effective were integrated strategies that combine financial disincentives with the spatial reorganisation of the urban environment in favour of pedestrians and cyclists. Special emphasis was placed on the importance of cartographic analysis, which enabled an assessment of the spatial configuration of restriction zones, their scale of coverage, and the extent to which transport measures are integrated into broader urban planning frameworks. The experience of New York City was included as an interregional example of the recent implementation of congestion pricing, thereby expanding the comparative perspective of the study. The results suggest that similar transport initiatives may hold significant potential for adoption in Ukraine, particularly in Kyiv. However, their successful implementation would require a comprehensive approach, including the development of high-quality public transport, the expansion of cycling and pedestrian infrastructure, and detailed technical and economic modelling of potential impacts on the urban transport system. Overall, the study confirmed that reorienting urban space away from private car use towards sustainable mobility represents a key direction of contemporary transport policy, with the capacity to enhance environmental safety and improve the quality of life in large cities. Further research could focus on additional cities where such restrictions have already been introduced or are planned. Another important area for more detailed investigation is the feasibility of implementing traffic restriction measures in Kyiv.

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## Conflict of Interest

None.

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# Обмеження руху транспорту як шлях до зменшення рівня автомобілецентричності міста

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**Анотація.** Сучасні міста надмірно перевантажені автомобільним транспортом, тому прогресивні міські адміністрації дедалі більше зосереджуються на оптимізації транспортних потоків, зменшенні затримок, підвищенні безпеки дорожнього руху та створенні комфортних умов для пішоходів і користувачів громадського транспорту, зокрема шляхом обмеження руху в центральних районах. Метою цього дослідження було проаналізувати заходи, впроваджені в європейських містах для зменшення транспортних заторів у центрах, а також результати, яких вдалося досягти. У статті розглянуто сучасні методи управління дорожнім рухом, що застосовуються в європейських містах (Барселона, Мадрид, Париж, Стокгольм) та у Нью-Йорку, визначено їх переваги, проблемні аспекти реалізації та потенційний вплив на подальший розвиток міської мобільності. На основі отриманих результатів встановлено, що значна кількість європейських міст здійснила перехід від автомобілеорієнтованої моделі міського планування до підходу, який надає пріоритет мобільності населення. Цей процес супроводжувався суттєвим розширенням інфраструктури для пішохідного та велосипедного руху. Систематичне зростання залежності від автомобілів призвело до очікуваних наслідків: перевищення пропускної спроможності існуючої дорожньої мережі, концентрації значної кількості заторів та збільшення викидів шкідливих речовин. Для подолання наслідків перевантаження міського транспорту, особливо в центральних районах, у низці країн було запроваджено обмеження, що включають як повну заборону руху, так і фінансові платежі за проїзд у визначених зонах. Як довготривалі, так і нещодавно впроваджені обмеження продемонстрували чіткий вплив на зниження транспортного навантаження в окремих районах, що сприяло скороченню часу поїздок і зменшенню викидів $CO_2$. Практична цінність цієї роботи полягає в тому, що вона створює можливість розробки та впровадження ефективних рішень для зменшення транспортних заторів у центральній частині Києва на основі успішного досвіду європейських міст

**Ключові слова:** управління дорожнім рухом; безпека дорожнього руху; затори; міська мобільність; екологія