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A study on city center accessibility and transportation network functionality: The case of Trabzon

Kent merkezi erişilebilirliği ve ulaşım ağı işlevselliği üzerine bir inceleme: Trabzon örneği

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Abstract

Accessibility is a key factor in shaping the functionality of city centers. Access through public transportation, the prioritization of pedestrian-friendly circulation, and reduced private-vehicle use significantly enhance urban usability. In cities where public transport systems and pedestrian infrastructure are underdeveloped, dependence on private vehicles often leads to congestion, traffic problems, noise, and air pollution. The road network surrounding Atatürk Area, an important node in Trabzon's city center, has changed continuously over time in response to the city's development needs. This study examines how different transportation modes affect city-center accessibility and functionality. To this end, the accessibility of Trabzon's city center and the effectiveness of its transportation network were analyzed across two periods through three transportation modes: pedestrian circulation, public transportation routes, and private-vehicle roads. The analysis is based on fieldwork and mapping methods. The findings indicate that pedestrianization efforts and improvements to public transportation between 2019 and 2025 have significantly improved mobility and traffic flow in the area.

Keywords: *Accessibility, city center, functionality, transportation network, urban planning*

Öz

Erişilebilirlik, kent merkezinin işlevselliğini belirleyen temel unsurlardan biridir. Toplu taşıma olanaklarıyla erişimin sağlanması, yaya dostu dolaşımın önceliklendirilmesi ve özel araç kullanımının azaltılması, kentsel kullanılabilirliği önemli ölçüde artırmaktadır. Toplu taşıma sistemleri ile yaya altyapısının yetersiz olduğu kentlerde, özel araçlara olan bağımlılık genellikle trafik sıkışıklığı, ulaşım sorunları, gürültü ve hava kirliliği gibi olumsuz sonuçlar doğurmaktadır. Trabzon kent merkezinin önemli bir düğüm noktası olan Atatürk alanı çevresindeki yol ağı, kentin gelişim ihtiyaçları doğrultusunda yıllar içinde sürekli değişim göstermiştir. Bu çalışma, farklı ulaşım türlerinin kent merkezinin erişilebilirliği ve işlevselliği üzerindeki etkilerini araştırmayı amaçlamaktadır. Bu doğrultuda, Trabzon kent merkezinin erişilebilirliği ve ulaşım ağının etkinliği; yaya dolaşımı, toplu taşıma güzergâhları ve özel araç yolları olmak üzere üç ulaşım türü üzerinden, iki farklı zaman diliminde analiz edilmiştir. Analizler, saha çalışmaları ve haritalama yöntemlerine dayanmaktadır. Bulgular, 2019 ile 2025 yılları arasında gerçekleştirilen yayalaştırma çalışmaları ve toplu taşımaya yönelik iyileştirmelerin, bölgede hareketliliği ve trafik akışını önemli ölçüde artırdığını ortaya koymaktadır.

Anahtar Kelimeler: *Erişilebilirlik, kent merkezi, işlevsellik, ulaşım ağı, kentsel planlama.*

Introduction

Today, access to city centers directly affects the quality of urban life. Public transportation systems and pedestrian-friendly transportation networks, in particular, help make city centers more functional and vibrant. Easy access increases economic activity, supports social interaction, and contributes to environmental sustainability by reducing traffic congestion. Therefore, in city-center planning, accessibility is not merely a transportation issue but also a social, economic, and environmental necessity. City centers contain commercial enterprises, public institutions, and cultural and artistic venues, and they support a wide range of everyday activities. Because they are usually connected to the rest of the city through well-developed transportation networks, they function as important urban nodes (Jacobs, 1961).

City centers, where economic and social activities are concentrated, also contain many of a city's historical and cultural structures and events. They are generally among the areas with the highest employment concentrations. These areas are characterized by high population density, intensive commercial use, and the coexistence of various social activities. In transportation terms, city centers are important points where public transportation routes from different parts of the city converge (Ruiz et al., 2024).

Given the high number of daily visitors to these areas, a well-designed and efficient transportation system is essential for accessibility and mobility. Such a system should include easily accessible public transportation, adequate parking for private vehicles, regular traffic flow, and safe pedestrian routes.

This type of transportation infrastructure is essential for city centers to function smoothly and efficiently. In general, the transportation system is one of the most significant elements of city centers and directly affects how well these areas function (Orhan et al., 2024).

Improving transportation infrastructure in city centers, for example by increasing bicycle and pedestrian routes, expands transportation options and enhances the quality of urban life (Vásárus & Lennert, 2022). Walkable and easily accessible city centers become more attractive for both business and tourism. Well-planned transportation networks can therefore also generate positive economic effects (Cervero & Kockelman, 1997). Similarly, public investment in transportation infrastructure has significant effects on land use and real estate values and plays an important role in shaping urban development policies (Alp et al., 2022; Turan et al., 2022).

The compatibility and integration of transportation networks are crucial for the physical and economic development of cities. Local governments should therefore prioritize transportation when preparing development plans. Transportation planning typically begins with a strategic vision developed through a comprehensive planning process (Mierzejewski, 1998).

As urban areas continue to expand and diversify, city centers have become increasingly complex spaces that concentrate a wide range of social, economic, and cultural activities. This growing intensity of land use and human movement places greater demands on urban transportation systems, making transportation planning a critical component of sustainable urban development. Consequently, the effectiveness of transportation networks is closely linked to the capacity of city centers to function efficiently and accommodate ongoing urban growth.

According to Duranton and Puga (2014), urban growth is closely associated with agglomeration economies and the concentration of economic and social opportunities within cities. As cities expand and attract more population and economic activity, mobility demand increases substantially, particularly in central urban areas. This growing concentration places pressure on transportation systems and contributes to congestion when infrastructure capacity and network performance do not keep pace with urban growth (Duranton & Puga, 2014).

Furthermore, rapid urban growth has changed the functioning of city centers. Although these changes have produced many positive developments, they have also generated problems such as

traffic congestion and environmental pollution. Inadequate road networks, limited road capacity, and increases in vehicle volumes during peak hours are among the main causes of traffic congestion, particularly in city centers. The effects of rapid urban growth on transportation systems and city-center functionality can also be observed in many medium-sized cities, where increasing population and vehicle ownership have not always been accompanied by corresponding improvements in transportation infrastructure.

Despite rapid increases in both population and motor-vehicle numbers in Trabzon, Ortahisar city center and its surroundings have not undergone a corresponding level of development. This is mainly because Trabzon is an old settlement and because its urban growth has occurred on mountainous terrain bounded by the sea. Although the importance of the issue is widely recognized, urban density has made it difficult to identify and solve the problem. Because all connections are concentrated in the city center, several negative conditions have emerged, including difficulty accessing the center, inadequate distribution from the center to surrounding neighborhoods, traffic congestion, pedestrian crowding, and environmental pollution. Access to the city square park, which has historical and cultural value, is provided by public transportation vehicles and private cars for transportation, business, and sightseeing purposes.

This study examines the accessibility of Trabzon city center and the functionality of its transportation network. The analysis focuses on three transportation modes: pedestrian routes, public transportation routes, and private-vehicle roads. It compares the conditions in 2019 and 2025. In this context, the study analyzes how pedestrianization projects and transportation regulations in the city center have affected accessibility, traffic congestion, pedestrian comfort, and public transportation use. The research was conducted using fieldwork and mapping methods and aims to reveal the effects of city-center interventions on urban quality of life.

1.1. Theoretical Framework

Accessibility, an important concept in urban planning, is defined as people's ability to reach workplaces, educational institutions, shopping areas, and entertainment venues. Accessibility encompasses not only physical infrastructure such as roads and public transportation, but also the socioeconomic factors that affect people's ability to use these transportation options (Pozo et al., 2025). The concept directly influences urban mobility because it determines how easily people can move around a city. In addition, accessibility in urban spaces is supported by legal frameworks intended to ensure equal access for all users. In Turkey, regulations such as the Law on Disabled People (No. 5378, 2005) and the Regulation on Accessibility Monitoring and Inspection (2013) establish standards for accessible urban environments.

The choice of transportation mode is one of the most significant factors affecting accessibility. In this respect, public transportation and active transportation systems offer the greatest potential to increase urban mobility and accessibility. High accessibility encourages the use of active transport modes such as walking and cycling, as well as efficient public transportation, all of which are essential for sustainable urban development (Hafiudzan et al., 2024).

Today, accessibility includes not only distance and travel time, but also the reliability and quality of transportation facilities and services (Petrova & Grunin, 2024). The concept of accessibility is strongly shaped by the spatial organization of transportation networks. Studies have shown that cities with strong network patterns and connections, together with street layouts that offer a variety of transportation options, have higher levels of accessibility (Peng et al., 2021). By contrast, disconnected or poorly connected transportation networks and limited transportation options negatively affect mobility in urban spaces, particularly in city centers. This reduces accessibility by increasing travel times and limiting access to basic services (Al-Daini et al., 2021).

Because transportation quality significantly affects the functionality and accessibility of city centers, the functional integration of different transportation modes—including public transportation, walking, cycling, and private vehicles—can strongly influence the overall social, economic, and environmental quality of the city center.

Walking and cycling networks greatly affect the quality of accessibility, particularly in urban centers where distances between destinations are short. Strong pedestrian and cycling infrastructure facilitates access to the facilities and services offered by the city center (Ruiz et al., 2024). In addition to its positive contributions to accessibility, research suggests that encouraging pedestrian and bicycle transportation in vibrant urban areas such as city centers can also have long-term positive effects on public health (Kraft, 2016). Facilitating pedestrian circulation, increasing pedestrian comfort, and encouraging longer stays in city centers are important not only for social and economic benefits but also for environmental and physical health (Oyama et al., 2024).

As the most populated and dynamic part of the city, the city center offers numerous opportunities for socialization and for participation in various activities (Semple & Fountas, 2023). City centers include public spaces such as squares, parks, and pedestrian-friendly streets closed to vehicles, enabling people to gather and socialize in safe and pleasant environments. Such spaces contribute significantly to urban identity by supporting a sense of community in the city center (Macke et al., 2019). The suitability of urban spaces for pedestrian use and comfort is defined as walkability. Walkability in city centers brings various economic, social, and environmental advantages. It also encourages walking as a transportation mode within crowded city centers, reducing motorized-vehicle use and the associated air and noise pollution (Saelens et al., 2003).

Walkability strengthens the vitality and economic attractiveness of the city center by drawing more pedestrians to the area (Besser & Dannenberg, 2005). However, when safe and accessible routes and circulation networks are not provided for pedestrians in the city center, mobility options become limited and individuals are directed toward motorized vehicles rather than walking (Bindajam & Mallick, 2020).

Although private vehicles provide convenience, their dominance in urban transportation can lead to problems such as air pollution, noise, and traffic congestion in city centers (Newman & Kenworthy, 1999). Dependence on private cars can also restrict accessibility. In crowded urban areas in particular, finding a parking space and losing time in traffic become serious problems, resulting in longer and more tiring journeys for residents (Suthanaya, 2016). Research shows that, in walkable cities, pedestrian-friendly urban design combined with a well-integrated public transportation network can greatly reduce people's tendency to use private cars (Olsson et al., 2021). This issue is particularly important in densely populated urban areas because efficient and easily accessible transportation networks significantly affect residents' quality of life. Moreover, public transportation enhances social equity by giving different socioeconomic groups improved access to opportunities throughout the city (Olsson et al., 2021). As income levels rise, private-vehicle ownership tends to increase, leading to shifts in travel preferences. Meanwhile, access to transportation services for low-income individuals largely depends on the availability and accessibility of public transit options (Akbulut, 2016).

In addition, pedestrian- and public-transport-oriented urban areas support social welfare and social equity because green areas and public spaces that encourage social interaction are not sacrificed for parking lots and vehicle routes (Gehl, 2010).

The integration of public transportation within a robust network significantly reduces reliance on private vehicles in crowded city centers. An affordable, easily accessible, and comfortable public transportation system, such as buses, trams, and metro lines, plays a crucial role in alleviating congestion, heavy traffic, and parking problems in city centers (Yang et al., 2018).

Furthermore, many studies have shown that proximity to public transit stations has a positive effect on real estate values (Stojanovski, 2020; Crotti et al., 2022).

In city centers that prioritize public transportation access, traffic congestion and the associated air and noise pollution are significantly reduced. This emphasis on public transportation also promotes social equity by making it easier for low-income groups to reach the city center. In addition, prioritizing public transportation reduces the need for parking areas and extensive road infrastructure. As a result, city centers can allocate more space to green areas, pedestrian routes, and social gathering places. Implementing a pedestrian-first transportation system and creating pedestrian-friendly urban environments enhance vibrancy and social interaction in the city center.

This article focuses on the operation and long-term effects of a project that aims to create a more sustainable accessibility system by reducing the need for private vehicles through transportation regulations in the city center. Accessibility is a broad concept in the literature and encompasses several issues. In this context, accessibility can be addressed from different perspectives:

1. Diversity in transportation modes and the effects produced by different forms of transportation (Selçuk & Szeri, 2019; Turan et al., 2022; Öztaşkın & Levend, 2023)
2. From the user's perspective, the comfort and safety of older adults, children, and people with disabilities in urban spaces (Aygün et al., 2018; Dönmez Kara, 2021; Seyhan & Acar, 2023)
3. Measurement and analysis of accessibility to urban facilities, including social facilities (Eray & Öksüz, 2026). Accordingly, this study focuses primarily on the adequacy and functionality of routes within the city center.

2. Methodology

This study examines the accessibility of Trabzon Ortahisar city center and the functionality of its transportation network. It fills an important gap by comparing transportation-system transformation projects in a medium-sized city in the Black Sea region over time and by revealing the effects of these regulations.

In this context, conditions in 2019 and 2025 were analyzed, and the effects of pedestrianization projects and transportation arrangements in the city center on accessibility, traffic density, pedestrian comfort, and public transportation use were evaluated. The study considered three transportation modes: pedestrian routes, public transportation routes, and private-vehicle routes. Route mapping and fieldwork methods were used. Route mapping was conducted using base maps obtained from Google Maps. Relevant transportation routes and pedestrian areas were manually identified and drawn on these base maps according to defined criteria. The spatial data representing the 2019 and 2025 conditions were determined through on-site observations in the study area. Based on these field observations, pedestrian routes, public transportation routes, and private-vehicle routes were mapped to illustrate spatial changes over time.

Within the scope of the research, Trabzon Ortahisar city center and Atatürk Area were selected as focal points, and the effects of the changes on urban quality of life were examined.

2.1. Defining the Scope of the Study Area

Due to its geographical location, Trabzon is bordered by the sea to the north and has developed on the slopes and foothills of the surrounding mountains. The city center is located in the İskenderpaşa Avenue neighborhood of Ortahisar District, on sloping terrain, at an elevation of 43 meters above sea level. The boundaries of the study area are shown in Figure 1. Within these boundaries, the seashore and Atatürk Boulevard are located to the north and east, respectively, while Yavuz Selim Boulevard lies to the south. To the west, the area is bordered by Uzun Sokak Street, Kahramanmaraş Avenue, and Kunduracılar Street.

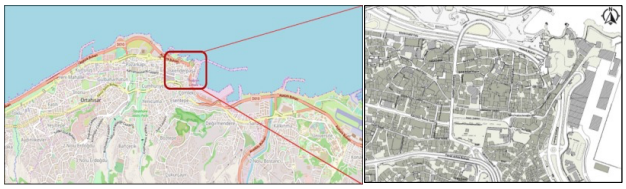


Figure 1. *Location and boundaries of the study area (authors' own rendering based on Google Maps data).*

Atatürk Area in the city center was designated as an "Urban Transformation Area" by Trabzon Municipality in 2010 (Sancar & Acar, 2016). A three-stage urban transformation project was carried out. This study compares the connection networks in this key area and its surroundings in terms of functionality and accessibility in 2019 (after the second stage) and 2025 (after the third stage). The boundaries of Atatürk Area are Gazipaşa Street to the west, İskele Street to the north, and Uzun Sokak Street to the south. The eastern side, previously limited to Kemal Dursun Street, now extends to Gazipaşa Street and includes a larger walkable area after the modifications (Figure 2).

Figure 2. *Stages and final state of the city-center transformation project (Sancar & Acar, 2016; Günebakış, 2025).*

3. Results

The pedestrian circulation, public transportation, and private-vehicle networks in 2019 were analyzed, followed by an assessment of the impacts of pedestrianization and transportation regulations in 2025. The study provides detailed explanations and maps of these changes and their outcomes.

3.1. Pedestrian Circulation Network

Atatürk Area, located in the city center of Ortahisar, Trabzon, serves both as a venue for official ceremonies and as a versatile public space for residents. It provides opportunities for rest, socialization, cultural interaction, and recreation, thereby supporting the social dynamics of urban life.

The plan analysis produced findings on pedestrian connections in the study area. Pedestrian-friendly routes have improved over time, as shown by the comparison of the pedestrian-route maps for 2019 and 2025. However, frequent intersections with vehicle routes still reduce pedestrian comfort and safety.

Three main commercial streets, running parallel to one another, are primarily used by pedestrians in the city center, as shown in Figure 3.

Figure 3. *Location of the three main streets (Kunduracılar, Uzun, and Kahramanmaraş streets) in the study area (authors' own rendering based on Google Maps data).*

In 2019, Uzun Street and Kunduracılar Street were reserved exclusively for pedestrians, while Kahramanmaraş Avenue carried both vehicle and pedestrian traffic. After the 2025 pedestrianization project, Kahramanmaraş Avenue was closed to vehicles, and all three streets and their connections became pedestrian-only. Previously, despite its importance due to nearby official institutions, Kahramanmaraş Avenue was uncomfortable and unsafe for pedestrians because of heavy vehicle traffic. Following pedestrianization, accessibility, functionality, and comfort improved, transforming the street into a significant public space with suitable pavement materials, enhanced urban furniture, and greater safety. As a result, social integration and communication were positively affected. Figure 4 shows the street in 2019 and 2025.

Figure 4. *View of Kahramanmaraş Avenue before 2019 (a) and after 2025 (b) (a: Google Street View; b: authors' archive).*

The three streets shown in Figure 3 provide the primary connections to Atatürk Area from the west side of the square. The pedestrian-friendly areas created as part of the park and transformation project provide easy access for all users, especially children, older adults, and people with disabilities. Although the western pedestrian connection is strong, the eastern connection remains insufficient despite improvements made in the third-stage development project. One reason for this is the location of Trabzon Port. In 2019, side-street connections were underused because of topographic conditions (Figure 5) and proximity to the old Çömlekçi neighborhood. The demolition of old houses in this area is part of ongoing urban transformation projects, but roads in Çömlekçi District are not yet operational.

In 2019, the connection between the square and the Çömlekçi subregion stops was inadequate, with no strong pedestrian axis. This has been partially addressed through the relocation of the stops. However, stronger connections between the square park and the coastal road are still needed.

Although Trabzon is a coastal city, the only physical connections to the sea in the study area are the overpass on Atatürk Boulevard and the pedestrian overpass at the end of Güzel Hisar Street. No other direct access exists. The completion of the third stage of the urban transformation project in 2019 created a visual connection between the city center and the sea by converting the parking area east of the square park into an urban balcony overlooking the sea and the port.

Figure 5. *Pedestrian-friendly roads and sidewalks closed to vehicles in the study area in 2019 (a) and 2025 (b) (authors' archive).*

Figure 6 shows the pedestrian-friendly roads and walkways closed to vehicles in the study area in 2019 and 2025.

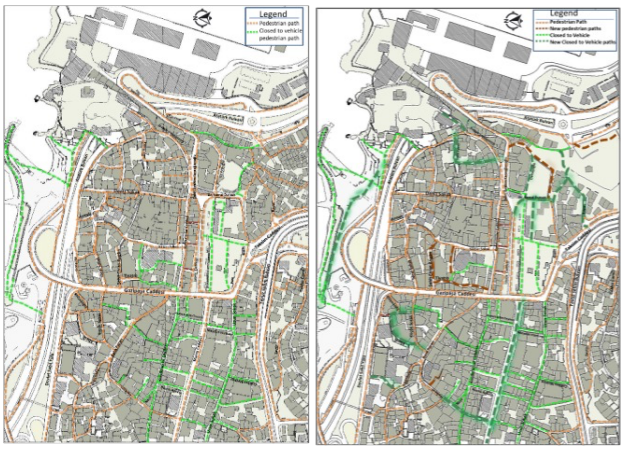


Figure 6. Pedestrian-friendly roads and walkways closed to vehicles in the study area in 2019 (a) and 2025 (b) (authors' own rendering based on Google Maps data).

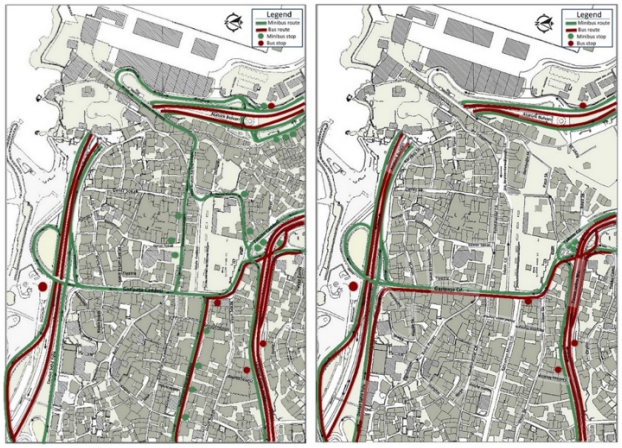
Public Transportation Network

In Trabzon's city center, public transportation includes minibuses, buses, and taxis. Public transportation routes and boarding stops are located within the study area. The long distances between stops and the configuration of bus and minibus routes often lead people to prefer private vehicles. Minibuses offer more flexibility than buses in terms of routes and stopping points, but their irregular schedules and the practice of operating only when full affect transportation choices. In addition, minibuses often fail to pick up and drop off passengers at designated stops, creating congestion for other vehicles.

In 2019, minibus departure stops were located on Kahramanmaraş Avenue and Kunduracılar Street, major city-center roads open to vehicle

traffic (Figure 7a). The minibus stops on these streets disrupted traffic flow, and the presence of both minibus stops and taxi stands on narrow roads led to congestion. Waiting minibuses blocked traffic, and the four stops on the southern part of the street caused further delays (Figure 7a).

As part of traffic-regulation projects, minibus stops have been relocated to specific points. Although the stops under the Yavuz Selim Boulevard viaduct south of Atatürk Area are now separated from the main traffic flow, traffic problems persist when minibuses enter and exit because Taksim Street is narrow. These stops also pose a risk to pedestrian mobility. Previously, the location of minibus stops and the narrow roads disrupted traffic flow, but recent changes have reduced traffic density in the area. This has decreased the noise and visual pollution caused by vehicle congestion and improved safety.

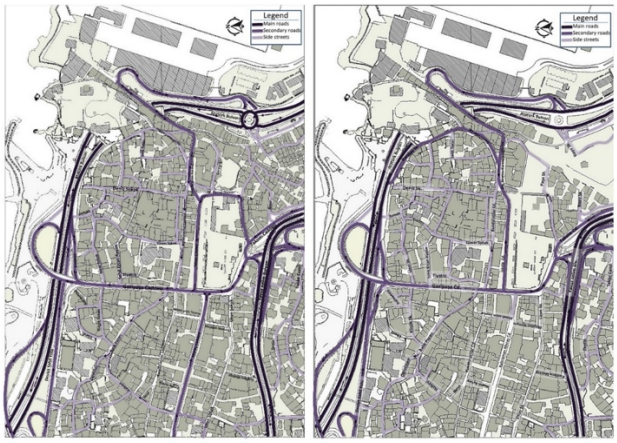


a. b.

Figure 7. *Public transportation routes and bus and minibus stops in the study area in 2019 (a) and 2025 (b) (authors' own rendering based on Google Maps data).*

Private Vehicle Network

In the study area, vehicle roads were classified into three levels of significance based on usage density and road width. Atatürk Boulevard and Yavuz Selim Boulevard are of first-degree significance, while roads such as Gazipaşa Street, Güzelhisar Street, and Taksim Street are of second-degree significance. Side streets are classified as third-degree roads (Figure 8).



a. b.

Figure 8. *Private-vehicle access roads in the study area in 2019 (a) and 2025 (b) (authors' own rendering based on Google Maps data).*

Significant changes have been made over time to the main north-south transportation routes in the city center. Since 2019, one-way and two-way traffic flow arrangements have been implemented on certain arteries, improving traffic balance, reshaping access points, reducing vehicle density, and accelerating traffic flow. On the east-west axis, Atatürk Boulevard and Yavuz Selim Boulevard are key connections. Kahramanmaraş Avenue, which was of secondary importance in 2019, is now closed to vehicles, with traffic rerouted to Gazipaşa Street and Karakaş Street. Bayır Street, formerly of tertiary significance, is now closed due to construction.

The east-west connection is sufficient, but improvements are needed on the north-south axis. The connections on İskenderpaşa Avenue and İbrahim Karaoğlanoğlu Avenue were weak in 2019 but have improved slightly. To strengthen the north-south connection, the use of Deniz Street and Balık Pazarı Street should be optimized. In addition, a connection from Çömlekçi Neighborhood could strengthen the link between Yavuz Selim Boulevard and Atatürk Boulevard.

Previously, all roads to the city center were open to two-way traffic, but congestion led to changes in traffic patterns. The current arrangements have reduced traffic density compared with 2019. The pedestrianization of Kahramanmaraş Avenue and nearby streets has reduced vehicle density and increased commercial functionality.

However, traffic density remains high at certain times. Past infrastructure problems, such as inadequate access, poor road quality, and insufficient parking, led to illegal on-street parking and restricted traffic flow. Recent measures, including parking bans and road-width adjustments, have improved flow, but some problems persist.

Discussion

To compare the evolution of accessibility and functionality in Trabzon's Atatürk Area over time, Table 1 presents a comparative analysis of pedestrian circulation, public transportation, and private-vehicle networks in 2019 and 2025. It highlights the effects of pedestrianization projects and transportation regulations on urban mobility, accessibility, and traffic flow. This comparison helps evaluate the effectiveness and outcomes of the implemented interventions.

Table 1. *Comparison of the three transportation-mode networks across the two periods.*

	2019		2025	
	Advantages	**Disadvantages**	**Advantages**	**Disadvantages**
Pedestrian Routes	• Uzun Sokak and Kunduracılar Street were fully pedestrianized.	• KMS was open to vehicle traffic, restricting pedestrian movement. • Frequent intersections between pedestrian and vehicle routes reduced safety.	• Three main streets and their connections, including KMS, were allocated to pedestrians. • Pedestrian connections, especially west of Atatürk Area, were improved.	• Deficiencies remain in the connection to the east. • Access to the seashore remains limited from both the east and the north.
Public Transportation Network	• Minibuses and buses provided broad coverage across different parts of the city.	• Minibus stops were irregular and often disrupted traffic flow. • The large number of minibus stops on KMS increased congestion.	• Minibus stops were rearranged, easing traffic flow. • Bus routes were changed and rerouted to reduce congestion within the city.	• Minibus stops on narrow roads continue to create congestion, particularly on YSB.
Private-Vehicle Road Network	• More routes were open to vehicle traffic.	• Major traffic congestion occurred because KMS was open to vehicles. • Parking areas were insufficient, causing vehicles to occupy road space.	• The complete pedestrianization of KMS reduced vehicle traffic and relieved pressure on the center. • Traffic flow on AB and YSB became more orderly.	• Connections to the east and south remain inadequate. • Parking problems continue to be significant.

Note: Abbreviations used in the table: Kahramanmaraş Street (KMS), Yavuz Selim Boulevard (YSB), Atatürk Boulevard (AB).

Between 2019 and 2025, the expansion of pedestrianized areas reduced traffic density and significantly improved accessibility and functionality. The closure of Kahramanmaraş Street to vehicles enhanced pedestrian comfort and safety, making commercial areas more functional. However, some access problems persist. The weak connection to the sea in the eastern part of the study area and the incomplete transformation in Çömlekçi limit the physical and visual connection between the city center and the coast. Despite improvements in public transportation, problems related to minibus stops and narrow roads continue to disrupt traffic flow.

Conclusion

This study examined the transformation of transportation routes around Atatürk Area in Trabzon city center between 2019 and 2025. By analyzing different transportation modes on these routes, the study investigated their effects on urban accessibility and functionality.

The research primarily sought answers to the following questions: How do pedestrian-priority arrangements in the city center affect accessibility? Have the arrangements made in the public transportation system changed traffic density and spatial mobility? Has reducing private-vehicle use through transportation-network arrangements increased urban functionality?

The findings show that pedestrianization initiatives and adjustments to the public transportation system have improved the quality of mobility in the area. They have balanced traffic congestion to a certain extent and enhanced spatial accessibility.

In this context, the study demonstrates that accessibility is determined not only by the physical capacity to reach a place, but also by the balance among different transportation modes. In this respect, it answers the research questions with concrete spatial evidence.

During the study, new questions emerged that could not be included within its scope but may inspire future research. For example, what methods can be used to measure the contribution of public transportation improvements to social equity and spatial justice? What positive and negative effects can pedestrianization have on commercial and economic activities in the long term, both in the area covered by this study and in urban areas with similar characteristics?

Furthermore, future research could quantitatively measure the effects of reduced private-vehicle use—achieved through regulations on transportation modes—on environmental factors such as air quality, carbon emissions, and noise levels. In this respect, the study opens a new ground for future interdisciplinary discussion rather than merely providing an area-specific analysis of the current situation.

In relation to the literature, the study fills an important gap by comparing transportation-system transformation projects in a medium-sized city in the Black Sea region over time and by revealing the effects of related regulations. In particular, the joint evaluation of pedestrian, public transportation, and private-vehicle networks makes a theoretical and methodological contribution to comprehensive transportation-planning approaches.

Finally, such studies can play an important role in providing municipalities and similar institutions with ideas for interventions, regulations, and urban design projects, encouraging them to adopt more sustainable approaches.

Declarations

Funding: The authors declare that no financial support or funding was received from any public, private, or non-profit organization for the research, authorship, and/or publication of this article.

Conflict of Interest: The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Ethical Approval: This study does not involve human participants, animals, or clinical trials. The research is entirely based on public space observations, fieldwork, and spatial mapping methods. Therefore, no institutional ethics committee approval was required for this study.

Data Availability: The datasets and spatial mapping data generated and/or analyzed during the current study are available from the corresponding author upon reasonable request. Base maps were obtained from Google Maps public data, and visual materials are preserved in the authors' personal archives.

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