Impact of rapid private motorisation growth on Tirana's traffic. Possible solutions and international success stories

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Abstract - *The study analyses one of the major causes for Tirana's traffic congestion: the rapid growth of private motorisation.*
The objective of the article is to provide part of the theoretical foundation for an initiative to develop a set of software tools for urban planners and to identify the requirements for this initiative.
The methodology is shaped by data scarcity and the need to identify best practices and case studies. Starting from these elements, a deep literature review has been conducted. Results have been analysed and discussed.
The most important result is evidence that motorisation is not the real cause to address; rather, it should be considered a trigger that has enabled system-level criticalities related to urban infrastructure and urban form.
Data scarcity has been confirmed, further underscoring the need for a reliable, advanced traffic measurement system.
Traffic congestion charging has been analysed as a potential solution, but it cannot be considered in isolation; it must be approached holistically alongside other measures operating on infrastructure and urban form. The success cases considered should not be implemented in Tirana without strong tailoring. The Tirana case could be a very interesting research field because, given its configuration, data scarcity, low capacity, and high informality coexist.

Keywords - Tirana traffic, Private Motorisation growth

Introduction and Diagnosis of the Current Situation

The city of Tirana, Albania's capital, is plagued by serious traffic congestion. This condition is recent because, historically, it has almost always a low motorisation rate.
In 2023, Albania had between 300 and 330 private cars per 1,000 inhabitants (INSTAT, 2024b; Eurostat, 2024), which is among the lowest rates in Europe where the average (in 2024) was 570-576 cars per 1,000 inhabitants, placing Albania as third from last in Europe (ACEA, 2026; Eurostat, 2024), ahead only of Turkey (176-189) and North Macedonia (264-303). At the same time, in the Balkans, Albania is surpassed by Kosovo (349), Montenegro (417), Serbia (377), and Bosnia and Herzegovina (321).
Tirana, on the other hand, has completely different figures, with around 500-550 cars per thousand residents and accounting for roughly one third of the entire national vehicle fleet (Euronews Albania, 2025; Gazeta Express, 2025). This concentration of vehicles makes it the prefecture with the highest number of vehicles (approximately 34-35% of the national total) (INSTAT, 2024a; INSTAT, 2025).
Residents (ACQJ, 2024; Kumaraku et al., 2025) frequently report long travel times, confirmed by the evidence of an average bus speed of about 11 km/h (urban roads) (GIZ, 2024a; Balkanweb, 2024). This speed is significantly below the minimum threshold of 15 km/h, as set by international standards to define "normal operation" for mass bus transport services (GIZ, 2024b; APTA, 2010).
This article examines a major cause of Tirana's traffic problems and proposes potential solutions.

Objectives and Methodology

This article is part of a theoretical framework of a larger project named UPT-Urban Planners' Toolset. The UPT project aims to develop a set of software tools to support urban planners in their work. It will be grounded in solid theoretical foundations in both urban planning and computer science.
In this article, a main analysis of the reasons for traffic in Tirana is conducted to support the definition of requirements for the traffic measurement module of the UPT project.
The objective is, then, to identify some potential causes of Tirana's traffic and analyse potential solutions. This article focuses on the primary cause: the growth of private motorisation. The analysis of infrastructural causes has been deferred to another study. The methodology followed has been a deep literature review to identify both prior studies on issues and on solutions. This literature review has focused on research on motorisation growth in Tirana and potential solutions, while also considering the lack of available data at the outset of the research. After the literature review, the gathered information has been organised and summarised in the results section. Then a discussion of these results was held, and conclusions were drawn.

Analysis

The growth of private motorisation

Then a Since the early 1990s, Tirana has experienced an explosion in private motorisation. Under communism, private car ownership was extremely limited, whereas in 2023, approximately 44% of households (336,000 out of 722,000) owned at least one car, according to Gazeta Tema (2024), citing the latest census (INSTAT, 2023).
INSTAT data (2024) report a national fleet of approximately 959,000 registered road vehicles, marking an increase of more than 10% over the previous year. Of these, passenger cars account for over 80% of the total (INSTAT, 2025a). In the same period, the Tirana region accounted for approximately 34.8% of the national vehicle stock (INSTAT, 2025b), highlighting a high concentration of vehicles in the capital, especially compared with the averages of other provinces.
The national vehicle fleet has a high percentage of older vehicles: European data indicate that a large proportion are over 10 years old, resulting in

Prefettura	Q2-2023	Q3-2023	Q4-2023	Q1-2024	Q2-2024
Total	828,306	848,127	867,765	887,321	914,925
Berat	33,714	34,464	35,267	36,032	36,975
Dibër	23,037	23,685	24,362	25,043	25,650
Durrës	110,922	113,748	116,639	119,446	123,590
Elbasan	57,111	58,502	60,119	61,486	62,959
Fier	76,997	78,965	80,582	82,169	84,204
Gjirokastër	18,233	18,608	18,991	19,429	19,865
Korçë	41,338	42,299	43,459	44,473	45,462
Kukës	19,328	19,802	20,319	20,851	21,364
Lezhë	41,152	42,099	43,029	43,975	44,952
Shkodër	59,247	60,565	61,882	63,093	64,471
Tiranë	288,265	294,843	300,998	307,890	319,545
Vlorë	58,962	60,547	62,118	63,434	65,888

Tab. 1. Motorisation growth in one year (data from the INSTAT report about Q2 2024)

reduced performance in both emissions and safety (Euronews Albania, 2024).

This growth, which is not balanced by a proportionate expansion of public transport and road capacity, puts significant pressure on urban traffic and parking, especially on radial corridors and in central districts (City of Tirana, 2021).

Congestion charges

A first solution would be to impose congestion charges to discourage vehicle access during peak hours (Tsay et al., 2013).

Successful experiences could inspire their implementation in London, Stockholm, and Singapore, where they have demonstrated significant technical effectiveness, resulting in 15%-30 % reductions in car traffic (Transport for London, 2008; Eliasson, 2009).

Despite their success abroad, these mechanisms could entail significant risks of failure in the Albanian context, particularly in Tirana, depending on institutional capacity, social acceptability and the availability of adequate alternative public transport (OECD, 2025). It is therefore advisable to assess the likelihood of success in advance through specific feasibility studies and risk analyses.

Risk of unpopularity

A first risk is obviously political, because the introduction of peak-hour pricing generally provokes strong initial public opposition (Tsay et al., 2013; Schade & Schlag, 2003).

In London's case, the implementation of congestion charging required a lengthy preparation and political negotiation process that lasted several years before its launch in 2003, and it remains subject to periodic institutional review (Transport for London, 2008). In Stockholm, too, an adequate trial period was necessary, followed by a referendum in 2006 that received relatively limited support, at 53% of voters (Eliasson, 2009).

For Tirana, the political risk is multiplied by limited experience (both institutional and civic) with highly complex urban policy interventions, the high fiscal sensitivity of the middle-income class, and the potential perception of an elitist policy favouring wealthier car owners. This last objection is supported by the fact that, in many similar contexts, users with greater spending power have not significantly reduced their car use during peak hours, even with tolls to access high-traffic areas (Goldman et al., 2006). Consequently, the adoption of congestion charging instruments should be accompanied by rebalancing and mitigation measures to ensure both effectiveness and distributive equity, for example, through progressive pricing systems, targeted exemptions, and the reinvestment of public transport revenues (Tsay et al., 2013).

Institutional and technological risk

Another type of risk is institutional and technological. The imposition of congestion charging mechanisms requires automatic number plate recognition (ANPR) systems and integrated digital platforms (GIZ/Changing Transport, 2018).

In the Albanian context, the adoption of such technologies poses significant challenges for management capacities. First, the use of ANPR systems requires continuous monitoring, rapid and highly automated processing of violations, and an efficient collection infrastructure, all of which can put pressure on current models of governance and public management (OECD, 2025).

Additional critical factors include data integrity, security and, more generally, data protection. Video surveillance networks require high levels of maintenance, cybersecurity, and transparency in

Fig. 1. Chaotic traffic in Tirana (image of the Author)

the management of both information and revenue to ensure the legitimacy and social acceptability of the system as a whole (ITF, 2018; Tsay et al., 2013). Finally, there is an issue related to interoperability, i.e. the ability to integrate ANPR systems with vehicle registers, tax databases and existing payment systems. Interoperability shortcomings could cause serious technical delays and compromise effective implementation (European Commission, 2020; ITF, 2018).

Risk related to the informal economy

Another risk factor concerns the informal economy. Tirana's transport system includes significant informal elements that require targeted policy responses in any congestion charging scheme. In Albania, the informal economy accounts for between 30% and 40% of GDP (OECD, 2025). The informal transport sector employs around 3% of informal workers (International Labour Organisation [ILO], 2018).

In Tirana's urban context, informality manifests in various ways that affect the design of charging mechanisms. Firstly, there are informal taxi services which, at certain times, have reached levels of use comparable to or higher than those of official services (Transformative Mobility Foundation, 2024; GIZ, 2023).

In recent years, digitisation through platforms such as Vrapon, Green Taxi, and Speed Taxi has encouraged a gradual formalisation of the market, alongside municipal policies that have promoted the spread of electric taxis (Transformative Mobility Foundation, 2024).

Despite this, a significant proportion of operators continue to operate informally. Such irregular activities include the exclusive use of cash payments, the employment of unauthorised drivers who use private vehicles for paid transport, and informal carpooling with monetary compensation (NTA, 2024).

Finally, many vehicles in Tirana serve multiple purposes, combining private, family, informal taxi, and commercial uses, making the application of congestion charges more complex, especially given the need for fairness and progress.

In this context, automatic number plate recognition systems could be integrated with procedures for contacting and regularising informal operators,

Fig. 2. Traffic in Tirana (image courtesy of Dmitry Limonov)

including grace periods, incentives for formalisation, and progressive compliance mechanisms. These processes should be accompanied by real-time monitoring tools that track formalisation rates, the spread of payment methods, and compliance levels (Tsay et al., 2013).

Risk associated with digital payments

Another risk factor is access to payment systems. Although financial inclusion in Albania has grown significantly in recent years, with the proportion of adults with a bank account rising from 40% in 2017 to 78% in 2021 (World Bank, 2022), cash remains predominant (International Monetary Fund [IMF], 2023).

There are also significant gaps in terms of digital literacy and access to banking services, making the application of pricing systems more complex (International Labour Organisation [ILO], 2018).

Credit scoring-based charging systems

Alongside monetary pricing, the literature also suggests adopting systems based on credits or access points for categories with specific work needs to mitigate the measure's regressive effects (ITF, 2018; Yang et al., 2011; Liu et al., 2024). These instruments are particularly effective when supported by improved public transport and integration with adaptive traffic management systems (Tsay et al., 2013).

Inadequacy of the exchange system at access points

Finally, it is strategic to build park-and-ride facilities at the city's main access points, which must be closely connected to high-frequency public transport. The experience of many European cities shows that such systems can absorb thousands of daily journeys, especially when integrated with congestion charging and efficient public services (ITF, 2018; European Commission, 2021). Vehicle renewal and scrappage programmes can also help to reduce the environmental impact of urban traffic (European Environment Agency, 2020).

Reasons for the persistence of problems

Why have these problems not been solved so far? The problems described above have long been recognised and well-documented in recent years. Unfortunately, significant progress has been very slow or even non-existent. This section will summarise the reasons these problems persist, despite everyone agreeing on their existence and urgency.

The analysis has been conducted taking into account both institutional and financial constraints.

Institutional constraints

Institutional capacity

Institutional capacity limits pose a serious problem: there is a chronic shortage of both personnel and technical expertise, which should not be underestimated. For example, until 2020 (GIZ, 2024a), the Tirana transport department operated with only six staff members responsible for managing public transport in a city of approximately 800,000 residents. This severe understaffing made proactive planning, effective management, and law enforcement virtually impossible. As evidenced by the GIZ report (2024a), the Department operated until 2020 in a reactive mode ('Reacting to issues as they arose'), managing various events, i.e. responding to crises rather than preventing them. Following a reform supported by GIZ, staff numbers were increased by 32% between 2020 and 2023, greatly improving the organisation ("We supported the enlargement of the transport department system by providing detailed job descriptions, operating procedures, process workflows, and on-the-job training.") Two new sectors were introduced: technical support and customer feedback), in particular technical support and customer feedback. During the same period, intensive training was conducted, which significantly improved staff expertise ("A 3-year-long training with UITP was carried out on topics such as public transport fundamentals, e-ticketing, IT & ITS technologies for public tran

Data and management systems

A second element, also linked to institutional capacity constraints, is the absence of a robust data-collection infrastructure and automated management systems.

Again, according to the GIZ report (2024a), until 2020, Tirana's transport system operated essentially 'blind', without any systematic collection of data on passenger volumes, bus speeds and reliability, or on the performance of the various routes. Operators provided commercial data in non-standard formats, without any verification mechanism. The municipality lacked a GPS tracking system, an automatic passenger counting (APC) system or performance monitoring tools. This data gap made it virtually impossible to make decisions based on facts and allowed private operators to operate with little accountability (GIZ, 2024a). The GIZ intervention demonstrated that even implementing basic data collection systems and simple analysis capabilities required several years of development, specialised training, and significant institutional evolution.

Institutional fragmentation

Another critical issue, at the institutional level, is coordinating a highly fragmented set of institutions (EBRD, 2016). According to Gora et al. (2024), institutional responsibilities in the metropolitan area are spread among:

- The three municipalities of Tirana, Vorë and Kamëz, which have a primary responsibility for road infrastructure management and certain aspects of public transport and urban planning
- The Ministry of Transport and Infrastructure (now Ministry of Infrastructure and Energy), which oversees transport policies and strategies at the

national level and may play a role in financing and supporting infrastructure projects
▪The private public transport operators, which are in charge of providing public transport services and managing bus fleets
In the early 2020s, there were 11 separate private operators (GIZ, 2024a; Bashkia Tiranë/Open Data), often characterised by potentially conflicting commercial interests. In 2025, according to journalistic sources, there were 12 (Brakaj, 2025) for 16 lines.
A further critical issue concerns the lack of integration among the planning for road infrastructure, land use, and urban mobility policies: in fact, historically, urban development and land-use decisions have not been systematically coordinated with transport strategies, often necessitating the introduction of sorts of integration planning tools, such as Tirana's Sustainable Urban Mobility Plan (SUMP) (City of Tirana, 2021; Transformative Mobility Foundation, 2024).
The GIZ document (2024a) emphasises the need for 'institutional development' and the support provided for 'improved management of new projects such as Bus Rapid Transit and the establishment of a Transport Authority in Tirana', confirming that such an authority did not yet exist at the time of its publication, i.e. that such coordination is still lacking. This serious lack of coordination can, once again, lead to reactive rather than proactive management and significant inefficiencies.

Contracts and procurement

Finally, again at the institutional level, the management of contracts and, more generally, of procurement processes has limited operational effectiveness.
Public transport contracts, in particular, are not integrated with systematic performance-related incentives. The GIZ document (2024a), referring to the period prior to 2022, confirms that operators received concessions for routes without any minimum service level requirements or effective enforcement mechanisms ('Although performance differed among the various operating companies, the system of checks and contractual measures was insufficient to ensure that the operators maintained and improved quality throughout the entire city', p.5). The EBRD (2018) also states that, in 2018, there was no direct subsidy system and therefore no compensation mechanism linked to service quality ("The MoT sets routes and fares, and there is no direct subsidy system."). The introduction in January 2022 of the first performance-based bus transport incentive scheme, with support from GIZ, marked a significant break with the past, as it represented the first structural change to the existing model and strengthened operator accountability.

Financial issues

Budget size

Resources received every year by Albanian municipalities amount to about 1–2% of GDP, severely limiting their ability to implement new projects effectively (OECD, 2025). For example, until the early 2020s, the Tirana Department of Transport lacked sufficient resources to conduct systematic passenger satisfaction surveys, leaving a serious gap in user feedback and significantly reducing its ability to manage public transport. It was only in 2023, with support from GIZ, that the first user survey was conducted, and the value of this type of tool for improving the service became clear (Transformative Mobility Foundation, 2024; GIZ, 2023).

Dependence on external donors

The most significant reforms to Tirana's transport system have largely been implemented through donor-funded projects rather than through structured domestic policy initiatives (Transformative Mobility Foundation, 2024). For example, the process of reforming the public transport system gained significant momentum in 2020, when GIZ entered into a partnership with Tirana's municipality (GIZ, 2023; Transformative Mobility Foundation, 2024). The e-BRT project was also made possible mainly thanks to external financiers (KfW for €50 million and the EU for approximately €31 million) through the Western Balkans Investment Framework (KfW, 2021; WBIF, 2024).
This model creates at least two critical issues. Firstly, reforms advance at the pace and according to the priorities of donor programmes, rather than based on the actual urgency of local needs (OECD, 2025). Secondly, long-term sustainability is uncertain, as local institutions may lack the technical and financial capacity to sustain successful implementation independently after the projects end (Transformative Mobility Foundation, 2024).
Another critical issue concerns the process of European integration. In fact, there is competition between local infrastructure priorities and the conditions imposed by the European Union and European for accession. Albania's accession process to the European Union requires multiple, extensive reforms across areas such as the rule of law, governance, public procurement, and administrative capacity (European Commission, 2022, 2023). In this context, transport is just one of many areas requiring investment and institutional development. Consequently, with the European Union highlighting corruption in procurement and administrative weaknesses as priority issues, for example, problems of urban congestion and traffic are receiving secondary attention (European Commission, 2023).

Discussion

In this analysis, only private motorisation growth has been analysed; however, as the literature review and results show, it was only a trigger for a set of issues that must be addressed. This set of issues is mainly composed of infrastructural deficits and inadequate urban form and will be addressed in a subsequent part of the study.
In this study, private motorisation growth is a system-issue amplifier rather than the real cause of the traffic congestion.
Regarding motorisation growth, the proposed solution was a congestion charge. However, it is clear that, on its own, it will not be effective and will instead mostly lead to social injustice, despite the measures proposed above to mitigate it. In a few words, congestion charges are a conditional measure, not an automatic one. They need to be implemented alongside other solutions to be effective. It is worth emphasising that, when implementing congestion charges, social equity should be treated as a design variable, not an optional outcome.
Another element that has emerged is institutional fragmentation. This issue must be addressed to ensure a smooth, coordinated approach to reducing traffic congestion.
A serious criticality has been detected in the data. The available data about traffic is insufficient, aggregated and of low quality. Data scarcity leaves Tirana operating in “blind” mode, with little or no feedback. This operational mode is far from any effective governance model and must be changed into a data-driven or data-aware one.
Many best practices have emerged from research, and they should be considered alongside success cases when proposing solutions. These solutions, anyway, must be strongly tailored to Tirana’s context, which has made them completely different from those in other cities. Tirana offers a valuable opportunity to develop research about a context characterised by low capacity, high informality, and data scarcity.
In addition, informality is not a collateral issue: it is a factor that limits the feasibility of a serious fight against traffic congestion. For this reason, informality should be addressed. When addressing it, it is advisable to take a progressive, incentive-based approach rather than relying on law enforcement to avoid social injustice again and, more importantly, to avoid further backlash against the traffic-reduction initiatives.

Conclusions

The rapid growth in motorisation must be considered the trigger that is enabling a systemic issue to emerge, rather than a stand-alone factor.
While the congestion charge has, in many cases, proven effective, its application in Tirana requires strong coordination with other initiatives and, at the institutional level, should be part of a larger programme of activities to address the traffic issue. Social justice and informality have been identified as two important design variables for each measure.
The analysis needs to be strengthened by considering other emerging issues, such as public transport efficiency, parking availability, the impact of road construction, and urban form reshaping.
This will be done in successive research on the infrastructural causes of Tirana’s traffic congestion. Regarding the aim of supporting the UPT initiative, this first step has highlighted the need to gather more data on traffic to better analyse traffic flows, traffic density, and other metrics, underscoring the importance of a robust component to measure traffic parameters reliably.

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