8th INTERNATIONAL CONFERENCE
”TOWARDS A HUMANE CITY“
New Mobility Challenges
Novi Sad 11th and 12th November 2021

Sreten Jevremović, MSc[1]
E-mail: s.jevremovic@sf.bg.ac.rs
Nataša Bojković, PhD[1]
E-mail: n.bojkovic@sf.bg.ac.rs
Tanja Živojinović, PhD[1]
E-mail: t.zivojinovic@sf.bg.ac.rs
Ana Trpković, PhD[1]
E-mail: a.trpkovic@sf.bg.ac.rs

[1] University of Belgrade, Faculty of Transport and Traffic Engineering, Vojvode Stepe 305, Voždovac, 11010 Belgrade, Republic of Serbia

THE INFLUENCE OF MICROMOBILITY ON SUSTAINABLE URBAN TRANSPORT POLICIES

Key Words
Micromobility
Development policy
Urban mobility
Innovative mobility
Sustainable development

Abstract

Rapid economic development, urbanization and technological progress have conditioned significant global changes whose effects can be seen through increased population mobility, the use of modern technologies, the emergence of new modes of transport etc. Most of the mentioned characteristics are closely related and reflected on the functioning of urban traffic-transport systems, which is why today's cities face various challenges. Existing sustainable development policies are focused primarily on the traditional approach of traffic-spatial planning, which does not recognize the specifics of new transport options. With the advent of micromobility, there were significant changes that needed to be considered at the strategic level and define activities for their implementation within local transport policies. In that sense, it is necessary to harmonize and improve the existing policies of sustainable urban development, in order to respond to new requirements.

The main goal of this paper is to consider the representation of new transport options within the existing policies of sustainable development of urban transport systems. Also, it is necessary to point out the shortcomings and potentials for improving these documents from the aspect of micromobility. Accordingly, an analysis of best practices and experiences of selected cities and countries was performed. Additionally, the paper analyzes the general impact of micromobility on transport policy development, with the aim of increasing the resilience and flexibility of cities in the process of responding to new and unexpected situations.

1. INTRODUCTION

Although not yet universally defined, micromobility refers to a set of different modes of transport, the latest representatives of which are e-scooters and e-bicycles. In addition to the above, micromobility vehicles include bicycles, skateboards, unicycles, e-skateboards, e-rollers, hoverboards, segways and other similar light vehicles used to transport one person, usually during short trips, or for the first/last kilometer [1]. It can be noticed that the term micromobility encompasses a wide range of vehicles with different technical and operational characteristics, which can be grouped into: traditional light human powered vehicles, electric and hybrid vehicles. It is also important to note that, in addition to private use, micromobility vehicles are increasingly becoming part of the public service in cities. Accordingly, the notion of shared micromobility differs, which includes the shared and public use of e-scooters, e-bicycles and other light vehicles [2].

The need to regulate micromobility, as a new transport subsystem, has emerged in almost all cities of the world, requiring rapid response, precisely because of the fast increase in the number of new vehicles on the network. It is important to emphasize that the current transport policies did not recognize the newly offered mobility options, which further complicated the process of regulation and integration.

The situation that, to a certain extent, supported and accelerated the integration of micromobility into traffic systems is the emergence of the Covid-19 pandemic. This pandemic has forced cities to promptly rethink their transport networks, and micromobility has emerged as a crucial mode for moving people, while minimizing physical contact [3]. Some cities have made good use of the pandemic and its rare positive effects, such as reducing the number of vehicles on streets, and have included micromobility in existing sustainable urban strategies and policies. Through pilot projects, testing the use of micromobility vehicles were performed, legislation, infrastructure was improved and enforcement and management policy was formed, which provided users with an adequate and sustainable alternative to passenger cars over shorter distances. Although various shortcomings were noticed during the integration process, cities and countries that have overcome the transition period are already actively working on improving transport policies, so that micromobility remains and takes its place in the modal share even after the pandemic.

The main goal of this paper is to consider the representation of new transport options within the existing policies of sustainable development of urban transport systems. Accordingly, an example analysis of the best world practice and experiences of six cities: Vienna, Paris, Madrid, Los Angeles (LA), Chicago and Auckland, was performed, in order to define the role and function of micromobility, but also to notice the advantages and the shortcomings of current policies. The main emphasis will be placed on e-bikes and e-scooters as the most widespread modes of transport within the micromobility subsystem. The research results presented in this paper can be used as an adequate basis for improving existing and forming future transport policies, which will cover the area of micromobility and actively treat its impact and function in the sustainability of cities and its transport systems.

2. MICROMOBILITY POLICY REQUIREMENTS

Current urban policies are mainly focused on the existing transport offer, which forms the basis of urban transport systems. However, within these policies, cities are oriented towards traditional forms of movement, i.e. motorized and non-motorized users, striving for their sustainability, equal participation and equal accessibility for all users [4]. With the advent of micromobility, there was a need to improve and supplement existing documents, to ensure the active participation of new modes of transport in traffic. This section reviews the most common and important upgraded parts of the current (micromobility) policies at the municipal and city level, including: curb space management, equitable standards and equity, enforcement and data standards (Figure 1) [2, 5]. Each of the policies presented in this chapter will be briefly described further in the paper.

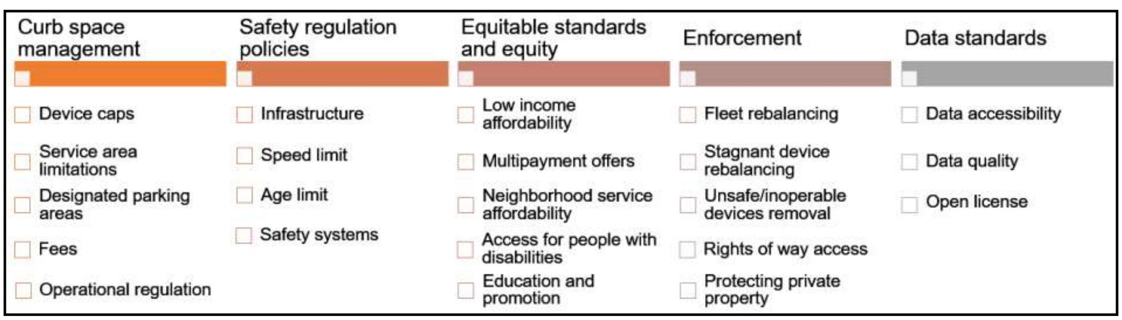

Figure 1. Most common micromobility policies, based on [2, 5]

2.1. Curb space management

This policy essentially relies on improving existing infrastructure capacities and defining measures to address infrastructure-related problems. According to the activities shown in Figure 1, Figure 2 illustrates examples of selected cities in which these measures have already been implemented.

As can be seen from Figure 1, device caps have been determined for each of the cities shown, except Madrid and Auckland, which do not have a defined limit on the number of e-bikes. For example, in the territory of Vienna fleet cap for bicycles is 1500, as well as for e-scooters. On the other hand, in Madrid regulatory fleet cap is 4800 for bicycles and 10.000 for e-scooters [6]. It is important to note that some cities define fleet cap per operator which is the case with Los Angeles (3.000 per applicant) [7].

Figure 2. Implemented measures in the analyzed cities as part of the curb space management policy

Another interesting strategy considering fleet cap is performance based cap represented mostly in American cities[1].

Service area limitation is, in the example of Vienna, controlled using geofencing. Geofencing is a technique that combines different geospatial data to delimitate real geographical zones through virtual boundaries or geofences. That way, it is possible to manage GPS-equipped vehicles when they cross a specific area boundary, and automatically reduce the speed or stop the vehicle [8]. This is especially useful for controlling the sidewalk movement, or movement on the other surfaces, where it is forbidden to use micromobility vehicles.

Because of the image of disorder, clutter, and pedestrian obstruction, every analyzed city provided designated parking areas (docking stations with corals, racks and other parking equipment). For example, the most interesting solutions are present in Los Angeles and Chicago which have designed red zones where it is forbidden to park or completely forbidden the usage of micromobility vehicles. These zones usually encompass high demand pedestrian zones and streets, parks or universities [9].

Equally important measures defined in micromobility policies are fees required from operators for participation and management of their fleet through the exploitation period. For example, in Los Angeles and Chicago, operators are required to pay the annual fee, as well as the annual per vehicle fee [7]. On the other hand, in Paris, operators are obliged to pay fees per device per year just to operate their fleet regularly [10]. In addition to the above, there are fees on a daily basis, per trip, station, etc., which are characteristic of American cities. In this way, competition is protected, and market equality between operators is enabled, while on the other hand, the required level of service and safety of vehicles is provided.

[1] Some cities have defined minimum or maximum number of trips per day (for example: Santa Monica defined 4 trips/day for e-scooter) which determine the decrease or increase of the fleet size based on the operator performance.

2.2. Safety regulation policies

The main activities within this policy are: defining the infrastructure, specifying the age limit, speed limit, and the use of safety systems (primarily helmets). European countries have mostly harmonized safety policies, so in Vienna, Paris and Madrid, for example, cycling infrastructure and carriageway are primarily used, the use of helmets is mandatory, while the age limit varies from 12 years (Paris) to 15 years [5], and speed limit is 25km/h. On the other hand, the federal states of America have quite different regulations, which are often determined at the regional level. For example, in Los Angeles, the use of sidewalks is allowed, while that is not the case with Chicago. The speed limit also varies from 25km/h to 42km/h, depending on the state.

What is important to note here is that, although a large number of cities still do not have a clearly defined safety policies, the countries that have updated these documents devote great importance to the safety aspect. Given that there are many differences in existing policies, it is extremely important to harmonize them locally and nationally, as well as internationally, in order to establish a unified control system and maintain the required level of traffic safety.

2.3. Equitable standards and equity

Given the different needs of people, especially people with reduced mobility, the elderly, children, but also people with lower incomes, it is necessary to provide policies so that all groups are treated equally and have an equal right to participate in traffic. Accordingly, many interesting approaches have emerged as a way of solving this problem. For example, the current micromobility policy in Vienna dictates that at least 1/3 of the fleet has to serve Vienna's outerdistrics, while at most 1/3 of the fleet can serve the city center [6]. On the other hand, Chicago developed an integral policy which requires the operator to have at least 25% of the vehicles available every morning, in two zones that are less connected by public transport.

It is also standardized that help, given for micromobility vehicles use, should be in multiple languages, as well as with the enabled audio option. Also, when paying for the vehicle daily use, some operators offer a multi-payment option (cash, credit card, city pass etc.) [8]. In Austin, as a promotional measure, city proposed discount schemes for students, elderly and low income groups [11]. An interesting strategy in the same city includes special benefits and discounts for the working population in the central zones of the city.

Another important measure implies the provision of a needed service to people with reduced mobility. In American cities (LA, Chicago, Washington etc.) e-scooters with a seat, three wheels, as well as e-scooters with a larger wheel diameter are produced in order to increase stability. Additionally, the user is required to be informed about the use of the vehicle and to have sufficient knowledge of traffic regulations [12]. In this way, special attention is paid to vulnerable groups of participants who, through the adaptation of micromobility vehicles, are provided and enabled to use the daily services of the city's transport system.

2.4. Enforcement

Enforcement is important both to maintain compliance with traffic regulations by micromobility users, and to ensure a high level and quality of service by operators. For example, number of users often does not leave their vehicles in designated parking spaces, sometimes inoperable vehicles could be present in the fleet, or the number of vehicles is not evenly distributed in the city area etc. In this regard cities, through their urban policies, oblige operators to regularly control their fleet. For example, in Los Angeles e-scooter companies must respond to a customer complaint within 2 hours and fix the problem. In Paris, that deadline is 24 hours [13]. This policy includes different types of problems such as: inoperable devices, obstruction of pedestrian movement, stagnant devices, obstruction of private property etc. It is interesting to note that primarily in American cities (Los Angeles and Chicago in this analysis) as well as in Auckland, the operator is required to rebalance the number of vehicles on the network, in a certain period of time, in order to provide service equity [2].

What is important to emphasize at this point is that public education and inter-company cooperation can help and reduce the administrative burdens of enforcement. Furthermore, cities' obligation is to provide operators and the public clear and concise guidance on micromobility use expectations to achieve required quality and level of service [2].

2.5. Data standards

Public availability and transparency of data should be one of the main requirements of cities and public agencies, in the process of registering micromobility operators. Standardized and open data allows to understand micromobility impacts, to identify gaps in the transportation network, monitor service standards, and offer multimodal, real-time transportation information [2]. Los Angeles was the leading city in the development of the Mobility Data Specification (MDS), which greatly facilitates the sharing and availability of data. In 2018, ten cities in the United States accepted the data standard, which is why the operators are obliged to ensure the availability of data using MDS.

In spite of the rapid emergence of micromobility, publicly available data on vehicle type ridership, mode shift, and trip replacement is minimal, as is the case with the cities analyzed in this paper. These data are important for understanding how micromobility is meeting the needs of a particular city, and managing enforcement rules through different urban transport policies. This is exactly the main reason why, a clear strategy, should be developed that will be shared with operators prior to service provision [14].

3. CONCLUSION

Although micromobility is a relatively new concept, vehicles belonging to this group have quickly established themselves as an adequate and sustainable alternative to passenger cars over short distances. However, the development of micromobility largely depends on the willingness of cities to accept the changes it brings. This paper presents some of the basic strategies and policies that cities use to solve problems that arose during the integration of micromobility. Curb space management will remain one of the burning issues that needs to be addressed, both due to the growing demands for the use of micromobility vehicles, and due to the increasing number of services. The integration of micromobility with public transport into a unified public service is a very important part of urban policies. In addition, cities must pay special attention to improve existing strategies, and provide equal and publicly available ministrations for all users. On the other hand, enforcement as a crucial management measure must be present to ensure the functionality of the system as a whole.

It is clear that these innovative technologies will have a disruptive impact on traditional planning and design concepts, which will have to be tackled in the future policy documents. A precise understanding of how people use these services is an indicator and input for effective management, and a contribution to more sustainable transportation systems.

REFERENCES

[1] City of Hoboken, “Achieving Sustainable Micro-Mobility”, USA, New York, 2020.

[2] S. Shaheen and A. Cohen, “Shared Micromobility Policy Toolkit”, 2019.

[3] D. Yanocha and A. Mackenzie, “Maximizing Micromobility: Unlocking Opportunities to Integrate Micromobility and Public Transport”, 2021.

[4] S. Gössling, “Integrating e-scooters in urban transportation: Problems, policies, and the prospect of system change” Transp. Res. Part D Transp. Environ., vol. 79, p. 12, 2020.

[5] B. Şengül and H. Mostofi, “Impacts of e-micromobility on the sustainability of urban transportation—a systematic review,” Appl. Sci., vol. 11, no. 13, 2021.

[6] Flucto Mobility Intelligence, “European Shared Mobility Index”, France, Paris, 2021.

[7] R. Zack, I. Shapiro, and C. Bailey, “Micromobility Policy Survey”, 2018.

[8] H. Badia and E. Jenelius, “Shared e-scooter micromobility: A review of travel behavior, sustainability, infrastructure, safety and policies Shared e-scooter micromobility: A review of travel behavior, sustainability,” 2021.

[9] Polis, “Macro managing Micro mobility”, Belgium, Brussels, 2019.

[10] G. Bailey and T. Febvre, "European Policy Guidelines on Shared Micro-Mobility", 2020.

[11] D. Lo, C. Mintrom, K. Robinson, and R. Thomas, "Shared micromobility: The influence of regulation on travel mode choice," N. Z. Geog., vol. 76, no. 2, pp. 135–146, 2020.

[12] National Association of City Transportation Officials (NACTO), "Guidelines for Regulating Shared Micromobility", USA, New York, 2019.

[13] Agora Verkehrswende, "Shared E-Scooters: Paving the Road Ahead Policy Recommendations for Local Government", Germany, Berlin, 2019.

[14] Institute for Transportation & Development Policy (ITDP), "Leveraging E-bikes and E-scooters for more livable cities", USA, New York, 2019.