

Micromobility in Pakistan

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ABSTRACT Micromobility has been widely adopted in cities around the world, offering personalized transport options that can reduce traffic congestion, reduce carbon emissions, and enhance user well-being. Micromobility options include bicycles, e-bikes, e-scooters, skateboards, etc. Moreover, micromobility goes hand-in-hand with active transportation. Hence, the health and general well-being of the community is also improved. However, micromobility methods are rare in Pakistan. This paper analyzes the constraints that hinder sustainable micromobility programs in Pakistan and presents strategies for their implementation. While examining the existing infrastructure, cultural norms, and government policies in Pakistan, this paper presents key areas where improvements can result in a much-needed shift to more sustainable and equitable transportation options in the country. With the right mix of policies and strategies, Pakistan can step-wise integrate micromobility options and move towards a more sustainable future.

INDEX TERMS Bicycle, E-scooter, Micromobility, Pakistan.

I. INTRODUCTION

Micromobility has emerged as a popular and viable alternative to traditional modes of transportation in many parts of the world. It refers to lightweight, often electric, vehicles that are designed for short trips within urban areas, including e-bikes, e-scooters, and shared bicycles. Micromobility offers a range of benefits, including reduced traffic congestion, improved air quality, and increased physical activity, among others. The attractiveness of micro-mobility is that it provides an adaptable, sustainable, economical, and instant transportation alternative [1], reducing the need for short-distance travel using personal automobiles [2]. Their growing popularity reflects an increasing realization that private vehicles have negative effects on wellness and the standard of life, especially when factors like traffic congestion, emission levels, and quality of air are considered [3].

Micro-mobility has increased in popularity recently as a shared mode of transportation that can be reserved via well-known smartphone apps thanks to technological advancements in mobile computing [4]. With the availability of more electric bicycles and pedelecs, the number of bicycle-sharing systems throughout the world has rapidly expanded from 17 in 2005 to over 2,900 in 2019 [5]. Figure 1 shows a bicycle-sharing station in Barcelona, where both normal and electric bicycles are conveniently docked. The popularity of dockless bike sharing (Figure 2) has also increased since 2010, first in China and then quickly spreading throughout the world [6]. Similar to this, e-scooter companies like Lime and Bird started offering their services in California in 2017 and extended to over 100 cities around the world two years later (Figure 3). Since then, they have logged millions of rides [7]. A comparable expansion has been seen in Europe,

where the e-scooter service operator VOI expanded to 10 countries within a year of starting operations in Sweden in 2018 and has now completed over 16 million rides [8].

Micromobility, an emerging trend around the globe, has the potential to change the way urban transport works. It offers a sustainable solution to the problems that are generated by conventional transport modes, such as environmental degradation, traffic congestion, and high levels of physical inactivity. However, micromobility is not properly introduced in Pakistan, where only a few disconnected programs are experimented with by the private sector. With the deteriorating traffic conditions in Pakistan along with the limited and inefficient public transportation system, micromobility options can prove to be a promising solution. Nevertheless, the introduction and successful adoption of micromobility in Pakistan would require considerable changes in the present infrastructure and travel behavior, influenced heavily by culture. This study aims to contribute to this topic by identifying the opportunities and challenges faced by micromobility in Pakistan and recommending policy and regulatory changes that will ensure its successful adoption.



FIGURE 1. Docked shared bicycles in Barcelona



FIGURE 2. Dockless Lime e-bike



FIGURE 3. Lime e-scooters

II. INFRASTRUCTURE

In this section, the present infrastructure in Pakistan and its limitations regarding micromobility implementation are discussed, followed by potential solutions for the identified issues.

Pakistan is facing an increasing issue of traffic congestion, made worse by poor road infrastructure and limited public transportation. This has led to an increased number of road crashes, higher air pollution, more time and fuel wastage, and a general rise in depression. Moreover, the non-existence of micromobility infrastructure such as bike lanes and parking space, makes it near impossible to utilize these options safely and efficiently. For micromobility to be introduced and actively adopted, supportive infrastructure is essential, as shown in Figure 4.

Several infrastructure solutions can be adopted to address these concerns. Bicycle lanes should be introduced in major cities stage-wise, starting with a study road, and then expanding to connecting roads until a city-wide network is established. These lanes would initially be established by using road markings, which would then be replaced by physical barriers such as bollards, curbs, or green medians, where applicable.

Curb-side would need to be redesigned to allow safe bicycle and e-scooter parking without posing a hurdle for pedestrians, road vehicles, or other bicycles. Ample parking facilities would need to be designed near major

public transport junctions such as near every BRT or metro station so that the city bicycle network would integrate well with the existing public transport system and act as a sustainable first-mile/last-mile solution.

To facilitate the usage of e-bikes and e-scooters, charging stations should be introduced at parking stations spread throughout the city (Figure 5). These charging stations should especially be installed near major shopping areas, transportation hubs, and business centers to improve accessibility and convenience for the users.

A supportive infrastructure, as mentioned above, will attract allied facilities such as bike-sharing systems and e-scooter rental services. However, the government would have to initiate investment under Public-Private Partnership (PPP) mode. Once the concept is launched, incentives should be provided to private companies to invest in this area and collectively improve the service, such as Mobike Korea [9].

III. CULTURAL NORMS

The second important element impacting the adoption of micromobility is the prevalent culture. Unfortunately, in Pakistan, car ownership is more seen as a status symbol rather than a necessity. This results in the wide perception of walking, bicycling and even using public transportation as a sign of poverty. Such a skewed view has led to very limited use of bicycles and other non-motorized modes and a general lack of awareness among Pakistanis regarding the benefits of micromobility.



FIGURE 4. Separated Bicycle Lane



FIGURE 5. E-bike charging station

Several interventions can be proposed to address the cultural barriers hindering the adoption of micromobility options. Firstly, public awareness campaigns should be launched to inform the citizens about the advantages of micromobility. The campaigns should be tailor-made for each sector of the community; for instance, health benefits and reduced carbon footprint should be the selling point for the affluent class, whereas modest running costs should attract the low-income segment of society.

Micromobility and active transportation should be promoted and encouraged in schools. This would engrain these mobility options into the young minds and improve its adoption with time. An example would be the practice of all Japanese schools to routinely walk the children, from a very young age, in their neighborhood including crossing roads when the pedestrian signals are green (Figure 6). This inculcates better behavioral traits such as waiting for the signal to turn green before crossing the road, using only zebra crossing, and adopting walking as a sustainable travel mode. Similarly, Pakistani schools can play a crucial role in improving the wider acceptability of micromobility options.



FIGURE 6. Japanese Nursery children walking in their neighborhood (Source: Japan Forward)

IV. GOVERNMENT POLICIES AND REGULATIONS

Although Pakistan has a National Transportation Policy with the aim of improving the efficiency and sustainability of the transportation system, micromobility is not addressed in it. This gap needs to be filled in order to explore all possible means to move towards a sustainable system. Hence a comprehensive micromobility policy, including the following components, is the need of the hour.

A. LEGAL FRAMEWORK

The legal framework should establish clear rules and regulations for the use of micromobility vehicles, including e-bikes and e-scooters. This should include guidelines for safety, licensing requirements, and insurance regulations to ensure that users are protected and held accountable for their actions.

B. INCENTIVES

The government has to introduce incentives for the adoption of sustainable travel options. These can be in the form of tax breaks or subsidies provided to the general public for the purchase of e-bikes and e-scooters. The Italian government initiated a subsidy program in 2020 in which people living in cities having more than 50,000 inhabitants were eligible to receive 500 euros towards the purchase of bicycles or e-scooters. Such incentives would allow the citizens to buy these vehicles by offsetting the high upfront cost.

C. INFRASTRUCTURE

Without a supportive infrastructure, such an initiative can never be successful. The micromobility policy should provide clear guidelines as to how the required infrastructure, such as bike lanes, would be developed with time and what would be the preferred financing model.

D. PUBLIC-PRIVATE PARTNERSHIPS

Suitable incentives should be laid down to attract private companies to launch bike-sharing schemes and e-scooter rental programs. This would make the system more accessible and increase the usability of the dedicated infrastructure and allied services.

E. EDUCATION AND AWARENESS

As previously discussed, proper education and awareness among the public are paramount for the successful adoption of micromobility. A comprehensive awareness program should be envisioned, and respective guidelines should be added to the policy documents.

V. CONCLUSION

With the increasing population density in major cities of Pakistan, micromobility presents an opportunity to create a more efficient and sustainable transportation system by decreasing traffic congestion on the roads and controlling the associated negative impacts. However, several barriers are present that hinder the adoption of this system. This paper has provided an overview of such obstructions and has proposed suitable solutions.

To introduce micromobility in Pakistan, several initiatives should be taken in parallel. Since supportive infrastructure is unavailable, major investment, guided by a comprehensive micromobility policy, needs to be funneled for infrastructure development. Likewise, a lengthy and well-planned awareness campaign would be required to dispel the negative societal perceptions associated with micromobility and active transportation. Private companies need to be involved to accelerate the implementation of the system and provide allied services.

As an additional recommendation, it is suggested that a pilot study be conducted in a living lab with the help of academicians and researchers so that the best possible way forward may be identified and the micromobility system may be rolled out with more confidence, catapulting Pakistan into a new era of sustainable mobility.



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