

Exploring E-bikes in the Era of Electrification

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BACKGROUND AND OBJECTIVES

The U.S. Department of Transportation (2021) has established a strategic plan to make transportation more accessible for everyone, including an initiative to “enhance opportunities for people with disabilities to walk, roll, cycle, and use micromobility services and other innovative mobility technologies.”

During the past few years, micromobility has shown promise for filling some of the gaps in community transportation systems. Micromobility vehicles and shared services have the potential to be particularly beneficial to members of two populations who often lack other options for daily transportation and active recreation: (1) people with mobility limitations related to age, disability, or health issues, and (2) people living in disadvantaged situations due to income, race, ethnicity, or other socioeconomic factors. E-bikes, sharing the same theme of providing “tiny personal mobility” but with different maneuverability, usage, and adoption patterns and rates, can play a leading role in advancing these initiatives.

The use of any new mobility is associated with perceptions, attitudes, concerns, and barriers. Existing e-bike literature is limited in terms of understanding how the populations (and the public they would encounter while riding) perceive e-bikes, as well as which concerns and barriers should be addressed to fully realize the potential of this mode for specific population groups, including marginalized populations. In this context, this study aimed to explore barriers associated with the access to and use of e-bikes and provide strategies for addressing the challenges.

METHODOLOGY

As part of this project, the research team first conducted a comprehensive review of the literature focusing on the general perceptions toward e-bikes and various factors that influence the formation of these perceptions as well as the concerns among potential and current e-bike users and the barriers hindering the widespread adoption of e-bikes, respectively. During this review, researchers acknowledged that it is important to acknowledge the intersectionality of various factors such as age, ability, socioeconomic status, and geographical location, which collectively influence access to and utilization of e-bikes. The scope of the study was therefore expanded to encompass a broader range of population groups with varying (dis)abilities and ages, as needed.

Following the review, the research team conducted expert interviews with micromobility stakeholders in the United States to identify common barriers to accessing micromobility options and strategies for overcoming those barriers. Specifically, the interviews addressed the uses and benefits of e-bikes and similar micromobility modes; potential barriers to the access or use of e-bikes; and strategies that communities, companies, and organizations have used or considered to overcome those barriers.

A total of 43 interviews involving 50 representatives of U.S. agencies, businesses, and nonprofit organizations were conducted. Interview participants included representatives of disability and other disadvantaged communities; e-bike technology developers and manufacturers; for-profit and nonprofit bikeshare programs that are deploying e-bikes; transit agencies that are employing micromobility options; and other organizations involved in micromobility advocacy, research, or implementation. An interview guide was prepared, but questions were customized as appropriate depending on the role, background, expertise, and experience of the interviewee. The interview responses were examined qualitatively using thematic analysis—a widely used qualitative research approach for interpreting textual data and providing rich and insightful findings.

RESEARCH FINDINGS

The e-bike uses varied somewhat according to how the shared e-bike program (if any) in their community was designed and currently operates. Commuting to work or school, running errands, and meeting other daily transportation needs comprised the most frequently described use of e-bikes in the interview responses. The second most frequently reported use was for recreational, leisure, and fitness activities, with trips to tourist and entertainment destinations mentioned as common uses in some locations. Interviewees described e-bike benefits including increased independence and opportunity for individuals and communities that are underserved by transportation networks; health and social benefits; reduced roadway congestion and increased environmental sustainability; and economic gains at both individual and community levels.

The literature review highlighted several concerns and barriers associated with the use of e-bikes. Significant concerns about e-bikes included safety, security, social stigma imposed on electric assistance, and loss of disability benefits. Along with these concerns, lack of knowledge, misperceptions, limited access, high purchase costs, and inadequate infrastructure were identified as major deterrents to adopting e-bikes. Using the insights obtained from literature review, the interview questions were designed to deeply dive into aforementioned barriers as well as other barriers identified through the interviews. The most frequently raised issues included safety, cost, access/availability, logistics surrounding e-bike support infrastructure, unique impediments for people with disabilities and older adults, and awareness and misperceptions of e-bikes among potential users and the surrounding community.

Interviewees offered numerous examples of strategies that have been implemented or are planned to address the identified barriers to e-bike use. Solutions implemented or planned included expanding bicycling infrastructure to safely accommodate powered and non-powered bicycles as well as pedestrians; improving links between e-bike networks and public transit; expanding funding to offset e-bike purchases and e-bikeshare user fees; and involving targeted communities in e-bike planning as part of overall community development. A wide range of strategies were also identified.

POLICY AND PRACTICE RECOMMENDATIONS

The findings of this study addressed a wide range of strategies. While details of these strategies varied—reflecting the uniqueness of each community, e-bikeshare program, bike library, or rebate program—several overarching recommendations emerged:

- *Establish partnerships—partnerships are key.* Examples included public transit partnerships to adjust fares or provide facilities, community service organization partnerships to serve the needs of disabled and disadvantaged populations, library and community center partnerships to provide e-bike libraries, and public-private partnerships with bikeshare providers and bike shops to moderate costs. Interviewees repeatedly expressed the need for and benefits of partnerships in expanding the opportunities and support for e-bike use in a community.
- *Address accessibility.* Many accessibility barriers can be addressed directly by local e-bikeshare programs (e.g., by acquiring adaptive bikes for people with disabilities, providing alternative payment and checkout procedures, etc.). To effectively identify and prioritize accessibility barriers, the targeted communities must be involved in the process. The importance of partnerships was again emphasized in many of the interviews for improving the accessibility and inclusivity of e-bikeshare programs—working through established advocacy and service groups to learn what each community needs.
- *Focus on community benefits.* The identified barriers to e-bike use emphasize the need for safer roadway infrastructure for all alternative transportation modes; for expanded funding for e-bikeshare programs and e-bike ownership (e.g., subsidies); and for policy decisions that support e-bike travel, storage, and charging needs. Overcoming these barriers requires the involvement of political decision-makers but also, fundamentally, the support of the community in which e-bikes operate. Continued outreach and education to community leadership, law enforcement, and road users will be key in normalizing e-bikes as a transportation mode.

The lack of national policy and funding mechanisms to support e-bike purchases, e-bikeshare programs, and adequate infrastructure provisions indicates a need for more research to quantify the benefits of e-bikes and similar micromobility modes to community mobility, economic, air quality, and congestion metrics. Further research is needed to better understand the benefits and barriers associated with specialized e-bikes, including e-cargo bikes and adaptive e-bike designs for people with disabilities. Research is also needed to explore the potential contribution of evolving micromobility options to create a more inclusive and sustainable transportation system.

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