

Price Mechanism and Policy Design to Increase the Usage of and Willingness to Pay for Bicycle-Sharing Systems: A Case Study of YouBike in Hsinchu City

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Bicycle-sharing systems (BSS) are an important public green vehicle for smart cities and are regarded as the first or last mile of public transportation systems (Wilby et al., 2020; Li, Lin, Gao, Meng & Song, 2020). Bicycle-sharing systems are an environmentally friendly form of urban transportation (Zademach and Musch, 2018). It has become a feature of many green urban transport networks (Xu, Ye, Li & Xu, 2018). Zademach and Musch (2018) further pointed out that increasing the use of bike-sharing systems is essential for sustainable regional development and environmental sustainability. The Netherlands, Denmark, and Germany have designed policies to let riding a bicycle be a safe, convenient, and practical way to become necessary transportation in cities (Pucher & Buehler, 2008b). Patel and Patel (2020) pointed out that by increasing the use of bicycle-sharing systems, to change the urban transportation landscape, the government's

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implementation of appropriate policies is the most effective green public transport facilitator. The change in the urban transportation system of sharing, energy-saving, and green promotes the development of an environment-friendly green city, and the design of appropriate policies and price mechanisms promotes bicycles. This study designed five policy scenarios, including pricing mechanism reform, infrastructure improvement, implementation of transfer measures, self-payment of insurance premiums, and locomotive parking fees, adopting the Contingent Valuation Method to evaluate the willingness to pay for ride YouBike under different policy scenarios. It was found that the preferential measures for the first 30 minutes of riding YouBike, the park-and-ride preferential plan, and the thrust plan of motorcycle parking fees can increase the utilization rate of YouBike. In terms of hardware facilities, additional stations and bicycle lanes will be added to meet the accessibility of users, and provide a friendly bicycle environment, which will help to improve the use of public green vehicles. In terms of user-paid bicycle insurance premiums, respondents are willing to pay NT\$3.22 per trip for personal injury insurance (up to NT\$ 1 million). The research results can provide price mechanisms and policy design references for bicycle-sharing systems, improve the use of green transportation, and help improve the city's sustainability.

Keywords: *Bicycle-sharing systems; Public bicycle; Contingent Valuation Method*

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