



A Qualitative Meta-analysis on the Socio-economic Benefits of the Implementation of Bike Lanes Towards Applicability in Metro Manila

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ABSTRACT

Since the onset of the COVID-19 pandemic, there has been an increase in bicycle use in lieu of the regulations on public transportation. However, traffic volume remains densely populated by private vehicles and freight trucks. In turn, cyclist safety is put at risk as bikers inexorably traverse major roads and highways allocated for motorists and other vehicles. This meta-analysis aims to collect bicycle-lane-related literature and classify the benefits of the implementation of bicycle facilities into four socio-economic categories: health and safety, transportation and mobility, the environment, and the economy, towards applicability in Metro Manila. There were 84 cycling-related literature curated into 40 articles being the primary studies analyzed. Findings of this study indicate that the investment in bicycle lane provision has shown to be more advantageous than risky. The researchers highly recommend implementing bicycle facilities towards city development, specifically with health and safety, improved transportation and mobility, environmental sustainability, and economic growth. Multiple studies verify the efficacy of said provision in reduced crash risk, improved cardiovascular health, decongested traffic, less carbon footprint, and increased tourism and employment. However, on an economic level, more research needs to be done to quantitatively measure the specific impacts of bicycle lanes to a city due to the lack of metric scale. Nonetheless, proper implementation of policies and facilities is predicted to resolve heavy traffic, air pollution, citizen cardiovascular problems, and vehicular accidents in Metro Manila, as well as reduce expenditure on both individual and city levels.

INTRODUCTION

Transportation has become one of the essential components in the development of a country¹. However, increased vehicle volume contributes to heavy traffic and road accidents. In fact, according to the World Health Organization², there are around 1.35 million road-related-accident deaths each year.

Automobiles are also contributors to toxic air pollution which are hazardous to human health³. Hence, bicycles as transportation are optimal in reducing air pollution and heavy traffic towards a sustainable lifestyle and a lighter traffic flow.

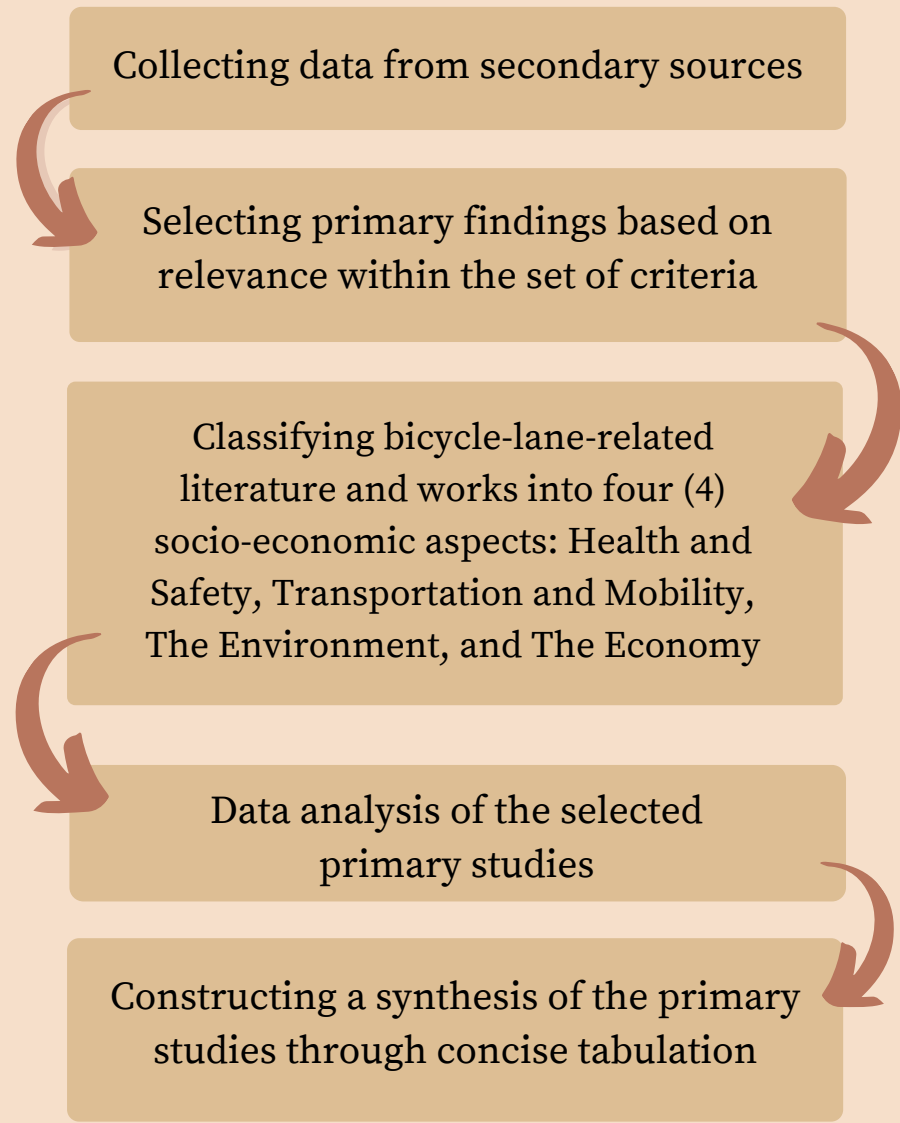
Additionally, given the increase in investments in bicycle infrastructures, biking has been acknowledged as a sustainable form of land transportation in the US⁴. Additionally, cycling also improves cardiovascular endurance, which boosts the overall emotional and mental state of an individual⁵.

Having enumerated the advantages of cycling, the use of bicycles may be advantageous in the Philippine setting, primarily since the country commonly associates cycling-related activities with low economic status and rarely as a form of transport⁶. It is expected to reduce heavy traffic flow and air pollution, specifically in Metro Manila.

Relatively, due to the COVID-19 pandemic, the government has limited public transportation to implement social distancing provisions⁷. Fortunately, Filipinos learned to adapt through the use of bicycles as an alternative form of transportation⁸. However, given the lack of bicycle facilities, both cyclist and motorist safety are at risk.

Therefore, it is highly encouraged that the Philippine government and its institutions invest in road planning, inclusive of bicycle lanes, towards a cost-effective preventive measure in road safety⁹. Furthermore, the funding of bicycle infrastructure will encourage citizens to pursue biking instead of automobiles.

METHODOLOGY



RESULTS

Eighty-four (84) cycling-related research studies, reports, and publications are found from online sources and research library databases using specific keywords as seen on Table 1.

accident statistics	mobility
bicycle infrastructure	pollution
bicycle-sharing	road planning
bicycles	road safety
bike facilities	socio-economic benefits
bicycle lanes	sustainability
economy	tourism
expenditure & savings	traffic congestion
health of cyclists	traffic volume
implementation	urban cycling

Table 1. Set of keywords

Out of the 84, only 40 articles were selected as the primary studies, in accordance with the following criteria:

- English language publications from the year 2012 to the year 2021;
- Pertinence to the four socio-economic aspects or categories, namely, Health & Safety, Transportation & Mobility, the Environment, and the Economy;
- Content relevance based on the following:
 - bicycle-lane related,
 - purpose,
 - methodology,
 - sample size,
 - investigated factor,
 - environment information,
 - outcome and measurement,
 - findings,
 - specified/inferred implications and recommendations, and
 - the overall quality of the study.

CONCLUSION

Bicycle lanes are highly recommended for city development, especially in terms of citizen health and safety, improved transportation and mobility, environmental sustainability, and economic growth. It has been proven to:

- Reduce crash risk, air pollution, and carbon footprint, towards health and safety;
- Decongest traffic and reduce vehicular accidents between cyclist, motorist, and pedestrians;
- Create tourism and employment, while increasing health and energy savings on an individual and city-wide level.

However, bicycle lanes are not without fault, wherein automobile vehicles and road obstructions still pose a significant danger to biker safety. Additionally, further study is needed on the specific impacts of bicycle lanes and usage, especially in the field of economy. Bicycle lanes could potentially be an avenue to generate sustainable income while creating jobs and enhancing a city's tourism. Though this was not quantitatively measured due to the lack of a reference point as standard for measurements.

Nonetheless, this study may function as structured scrutiny of existing bike lane provisions from different countries and local regions, which can be utilized in the execution of bike lanes in Metro Manila. To achieve efficient city-wide cycling transport system, experts in transportation and mobility may find necessary considerations from the following findings:

- a) The lack of monitoring, enforcement, health-related policies, and proper road designs may hinder the potential of bicycle lanes to reduce crash risk and road accidents.
- b) More policies that cater to both cyclists and motorists need to be implemented. Factors like cyclist preferences and existing facilities must be considered in road planning and design to ensure a better flow of overall traffic and increased convenience and safety.
- c) It must also be noted that there is a relation between a pleasant environment for people to cycle and their willingness to cycle in the community.
- d) Lastly, more investments are recommended, given the economic impact and reduced expenditure in the long run. Besides sustainability, increased savings for health investments and urban planning are expected.

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¹Rodrigue & Notteboom, 2020
²World Health Organization, 2020
³Union of Concerned Scientists, 2014
⁴Marshall, Ferenchak, & Janson, 2018
⁵Harvard Medical School, 2016
⁶Larrazabal, 2020
⁷Cabrera, 2020
⁸Romero, 2020
⁹Gu, Mohit, & Muennig, 2016