The bicycle as contribution to the logistic efficiency of freight transport in the last mile

Guillermo Arcila Mena, C.E.
Carlos A. Gonzalez-Calderon, Ph.D.
John Jairo Posada-Henao, Ph.D.

Department of Civil Engineering
Universidad Nacional de Colombia at Medellin
OUTLINE

• Introduction
• Use of the Cargo Bikes
• Purpose of investigation
• Modelling Approach
• Variables
• Case study: Medellin, Colombia
• Conclusions and Recommendations
1. INTRODUCTION

Urban freight transport (externalities)

Positive
- Economic development

Negative
- Congestion
- Noise
- Pollution
- Others...

Some strategies to mitigate negative externalities

- Time windows
- Weight and size restrictions
- Cargo Bikes
- Electric vehicles
- Traffic Ban

Others...
2. WHAT IS THE PURPOSE OF THIS INVESTIGATION?

To estimate econometric models that allow predicting the generation of last mile deliveries in a metropolitan area.

How?

- The regression models that are able to represent the trips
- The last mile deliveries
- The market areas

Data from of the freight origin-destination survey and traffic counts.
3. MODELLING APPROACH

Market Areas
4. VARIABLES

Slope
4. VARIABLES

DISTANCE

1 km
1 Mile
2 km
2 Miles
4. VARIABLES

DIMENSIONS
4. VARIABLES

WEIGHT

\[
\begin{align*}
\text{lb} & \quad \text{kg} \\
\uparrow & \quad \downarrow \\
\frac{1 \text{ kg}}{} & \quad \text{1 kg.}
\end{align*}
\]
4. VARIABLES

TYPES
5. CASE STUDY: MEDELLIN, COLOMBIA
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March 2017
Environmental red alert was declared

“Medellín: SOS por el aire”, por Pablo Montoya

“¿No permitamos que Medellín se convierta en una pequeña Pekín, en un pequeño Cairo, en una pequeña Ciudad de México, y deje que estas ciudades desmesuradas y malas por su contaminación. ¿No deberíamos construir un movimiento cívico capaz de hacerse oír”.

Medellín le caminó a la emergencia ambiental

Mas espacio para peatones, taxis y ciclistas en el primer día de alerta roja por contaminación.

Source: Alcaldía de Medellín (2017)
THE USE OF CARGO BIKES: Freight Trips

The use of the bicycle as a mode of transport of cargo is poor used in different cities, For the city of Medellin: about 5% of the freight trips are transported by bicycle.
THE USE OF CARGO BIKES: Cargo (Tons)

The use of the bicycle as a mode of transport of cargo is poor used in different cities. For the city of Medellin: about 4% of the cargo (tons) is transported by bicycle.
THE USE OF CARGO BIKES
# THE USE OF CARGO BIKES

2018 Freight Origin-Destination Survey

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<th>Origin</th>
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<th>2014</th>
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VREF CENTER OF EXCELLENCE FOR SUSTAINABLE URBAN FREIGHT SYSTEMS
SURVEYS

Surveys are being carried out with Rappi, Servientrega and MedeBike transporters to know the characteristics of the routes. Moreover, the idea is to also know the volume and weight of the goods transported to be able to include the different variables in the models.
PRELIMINARY RESULTS

Bike features (MedeBike)
- Average cargo capacity: 120 kg
- 6 owned vehicles
- Cost greater than $1,455 USD
- Assisted pedaling: Power 750 W

Travel characteristics
- Rappi
  - Average travel distance: 30 km
  - 10 daily deliveries
  - Residential areas
- MedeBike
  - Average travel distance: 25 km
  - 60 daily deliveries
  - Commercial areas

Bike features (Rappi)
- Average cargo capacity: 18.5 kg
- 90.6% owned vehicles
- 81.3% Cost less than $145 USD
- 100% Mechanical pedaling
7. CONCLUSIONS AND RECOMMENDATIONS

• This study will allow to conclude if the use of the bicycle as a mode of transport of goods is an applicable alternative for the city of Medellin, identifying the areas and the optimal distances to implement the distribution or collection of cargo in the last mile.

• The need to estimate models to represent the delivery of goods through a project that promotes sustainable development through the use of the cargo bicycle as a mode of transport could be beneficial for many cities in the country.
8. REFERENCES

• Área Metropolitana del Valle de Aburrá and Universidad Pontificia Bolivariana, “Actualización del inventario de emisiones atmosféricas del Valle de Aburrá,” 2014.
Questions?

Guillermo Arcila Mena, C. E.,
Graduate Research Assistant
Universidad Nacional de Colombia - Sede Medellín
garcilam@unal.edu.co