Planning and management of urban freight transport

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1. INTRODUCTION

The main objective of my research is to plan and manage freight transport in urban areas to minimize their negative aspects, such as increase of congestion and pollution.

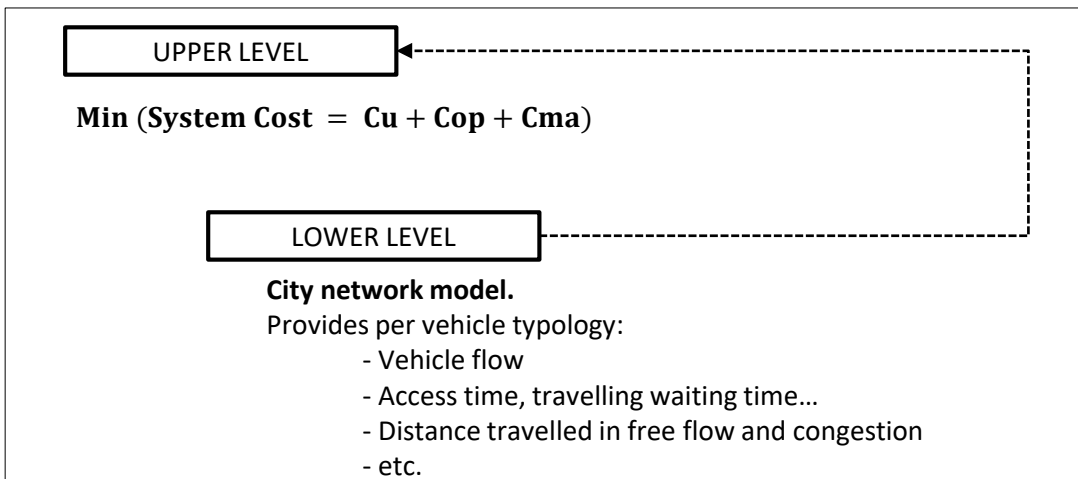|	2016												2017												2018											
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
REVIEW OF THE BIBLIOGRAPHY				■	■	■	■	■	■	■																										
DEFINITION AND MODELLING OF URBAN FREIGHT MEASURES											■	■	■	■	■	■	■	■	■	■	■	■	■	■												
APLICATION AND EVALUACTION OF THOSE MEASURES																		■	■	■	■	■	■	■	■	■	■	■	■							
INTERNATIONAL STAY (ROMA)															■	■	■																			
GUIDE TO PLAN, DESIGN AND MANAGE URBAN FREIGHT TRANSPORT SYSTEMS																														■	■	■	■	■		
FINAL REVIEW OF THE THESIS																																	■	■	■	
RESEARCH PAPERS																																				
State of the art																									■	■										
Measures																		■			■									■	■					
Decision support system																																	■	■		

2.1. MINIMIZING THE IMPACT OF LARGE FREIGHT VEHICLES

The aim of this measure is to determine journey distribution of vehicles via different routes:
- Defining fleet capacity and size
- To minimize economic, social and environmental costs.

A bi-level methodology has been applied:

UPPER LEVEL

$$\text{Min (System Cost} = \text{Cu} + \text{Cop} + \text{Cma})$$

LOWER LEVEL

City network model.
Provides per vehicle typology:
- Vehicle flow
- Access time, travelling waiting time…
- Distance travelled in free flow and congestion
- etc.

Ezquerro, S., Romero, J. P., Moura, J. L., Benavente, J., & Ibeas, Á. (2018). Minimizing the Impact of Large Freight Vehicles in the City: A Multicriteria Vision for Route Planning and Type of Vehicles. *Journal of Advanced Transportation*, *2018*. (Q2)

2. URBAN FREIGHT MEASURES

2.1. MINIMIZING THE IMPACT OF LARGE FREIGHT VEHICLES

CASE OF STUDY:

To minimize economic, social and environmental costs:
- How many vehicles?
- Which type of vehicles?
- Which route have to take each vehicle?
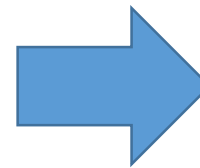
RESULTS:
- 10 heavy trucks, one by the red route and 9 by the blue route.

2.2. DESIGN THE NUMBER OF DELIVERY BAYS NEEDED.

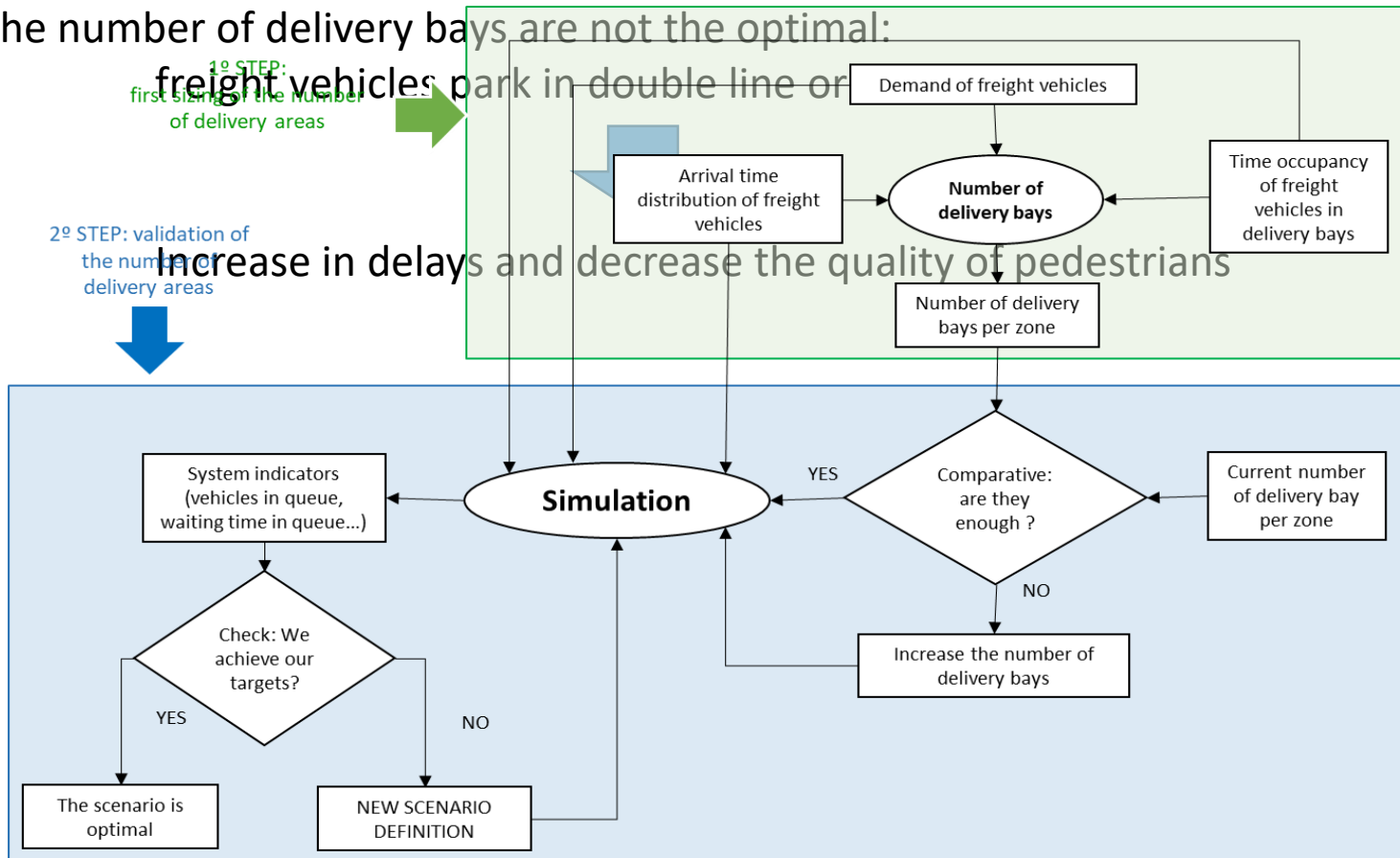If the number of delivery bays are not the optimal:

freight vehicles park in double line or

Increase in delays and decrease the quality of pedestrians

1º STEP: first sizing of the number of delivery areas

2º STEP: validation of the number of delivery areas

Demand of freight vehicles

Arrival time distribution of freight vehicles

Number of delivery bays

Time occupancy of freight vehicles in delivery bays

Number of delivery bays per zone

System indicators (vehicles in queue, waiting time in queue…)

Simulation

Comparative: are they enough ? — YES

Current number of delivery bay per zone

NO

Check: We achieve our targets?

Increase the number of delivery bays

YES

NO

The scenario is optimal

NEW SCENARIO DEFINITION

UNDER REVIEW: Ezquerro, S., Comi A. & Moura, J. L. A methodology for assessing the supply of on-street delivery bays in urban areas. Case Studies on Transport Policy (Q2).

2.2. OPTIMIZE THE NUMBER OF DELIVERY BAYS

CASE OF STUDY:
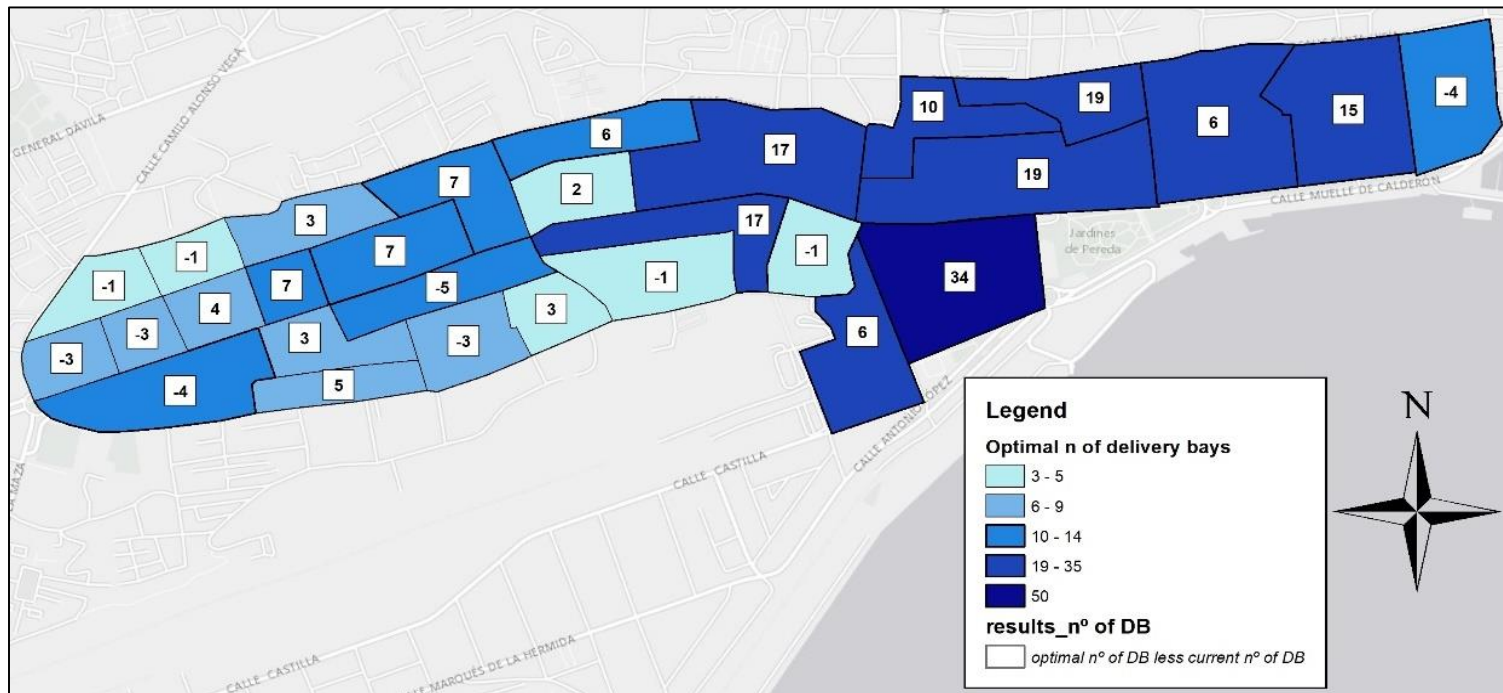
RESULTS:

PUBLISHED PAPER:

- Ezquerro, S., Moura, J. L., Ibeas, Á., & Benavente, J. (2017). Optimization model for school transportation design based on economic and social efficiency. Transport Policy. (Q1)

- Ezquerro, S., Romero, J. P., Moura, J. L., Benavente, J., & Ibeas, Á. (2018). Minimizing the Impact of Large Freight Vehicles in the City: A Multicriteria Vision for Route Planning and Type of Vehicles. Journal of Advanced Transportation, 2018. (Q2)

UNDER REVIEW PAPER:

- Ezquerro, S., Romero, J. P., Moura, J. L., Benavente, J., & Ibeas, Á. (2018). Minimizing the Impact of Large Freight Vehicles in the City: A Multicriteria Vision for Route Planning and Type of Vehicles. Journal of Advanced Transportation, 2018. (Q2)

4. Educational activities

Courses
- 1º year:
    - Simulation models of transport systems. University of Cantabria.
    - Models of public and private transport networks with and without congestion. University of Cantabria.
    - EDUC basic course.
    - EDUC advance course.
- 2º year:
    - "Use and analysis of the spacial component of information through Geographic Information Systems (GIS). Advanced level". University of Cantabria.
    - Logistica territoriale. Tor Vergata University.
- 3º year
    - Excel. Advanced level. (12h). University of Cantabria
    - Winter school in "Methods and models in Freight Transportation and Logistics". University of Padova

Conferences
    - Euro mini conference on "Advances in Freight Transportation and Logistics" in Padova.

Mobility
- International stay at Tor Vergata University in Rome from March to June 2017.

Planned educational activities
- Course: "Big data with Pyhton" on July
- Conference: XIII Congress of transport engineering on June.

THANK YOU FOR YOUR ATTENTION

Sara Ezquerro Eguizábal