UNIVERSIDAD DEL NORTE
Barranquilla - Colombia

UNIVERSIDAD DE CANTABRIA

Parking Policies: A Look at Public Space Considering Competition Between Passenger and Freight Vehicles

Maira Delgado Lindeman

Content

1. Thesis advance
2. Achievement of competition

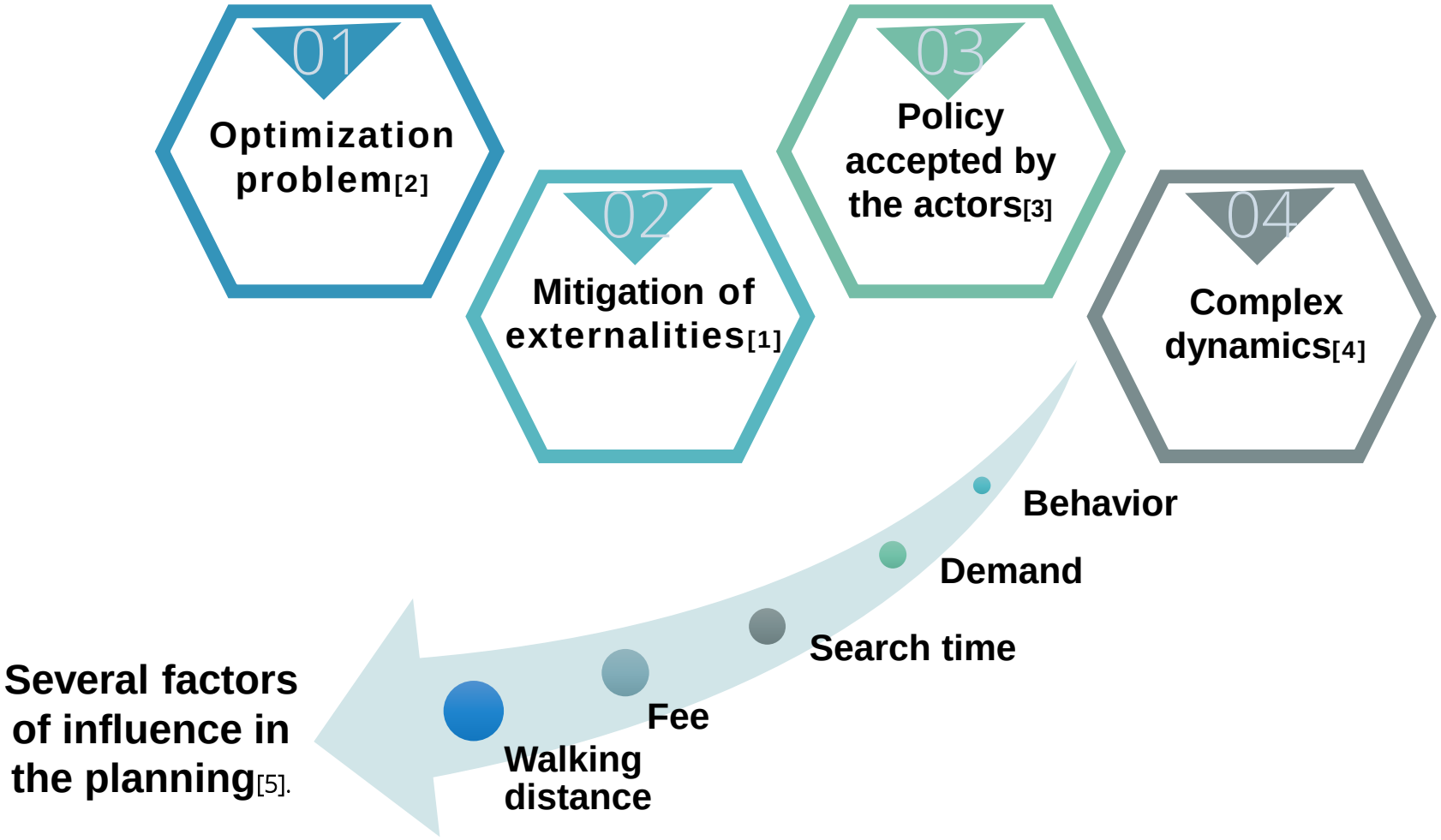
Context

Inadequate parking management generates externalities

(Brooke, Ison and Quddus, 2014).

Cartagena - Colombia

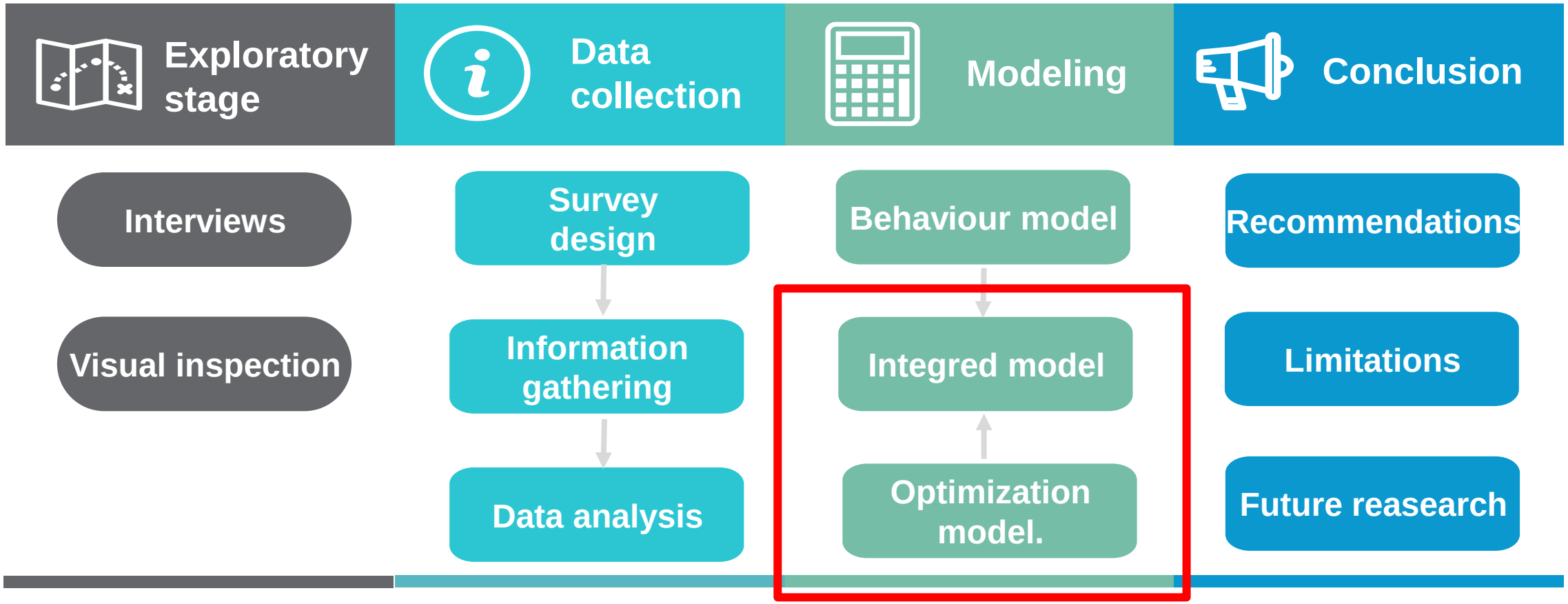
What do we know about parking lot planning?



Objetive

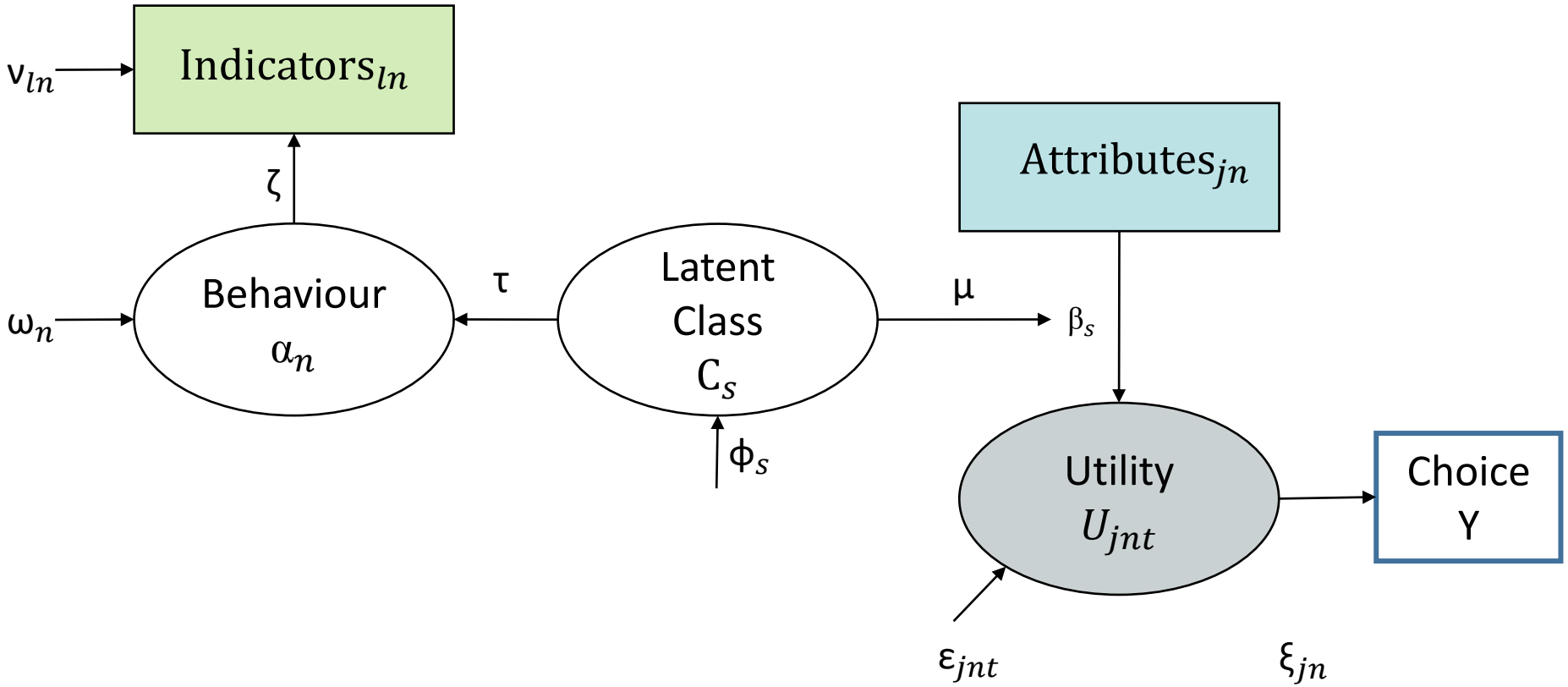
Develop a mathematical model using **social welfare** criteria that allows managing the planning of **on-street parking policies** considering **competition** for space between users of freight and passengers vehicles.

Methodology



Review and constructions of the state of the art

Behaviour Model for each user



Modeling Framework - Integrated Latent Variable and Latent Class model (ILVLC).

Optimization Model: competion criteria

Max: Level of Service (SL)

SL = Percentage of vehicles served (SV) + Percentage of use of Parking (PU)

– Percentage of Vehicles Searching for Parking(SP).

subject to:

1) *Capacity restriction.*
2) *Time window restriction.*
3) *Restriction of duration time.*
4) *Restriction for the reuse of space.*
5) *Parking exclusivity restriction.*
6) *Non-negativity constraint and nature of the variables.*

Allocation Model Approach - Mixed Integer Nonlinear Programming (MINLP).

Integred Model: Social Welfare criteria

Max: Social Welfare (SW)

SW = Producer Surplus (PS) **+** *Consumer surplus (CS) - Externalities (*$\mathcal{E}$*)*

Assignment model objective function integrating behavioral model.

Conclusions and future work

- The **relevant factors were identified** in the choice of parking lots for users of freight and passenger vehicles.
- The allocation model that **maximizes the level of service** was proposed. Defined by the percentage of users served, the percentage of use of parking lots, and the percentage of circulated vehicles.
- It is expected to integrate the behavior model into the optimization model. Looking for a **social welfare approach**.

Achievements of competences

Compulsory multidisciplinary training

- Basic Courses - **Completed**
- Advanced Courses - **Completed**

Favourable assessment of PI

- 2020 Assessment **- Favorable**
- 2021 Assessment **- Favorable**

Achievements of competences

International scientific publications

- Scientific Publications:
  - Amaya, J., Arellana, J., & **Delgado-Lindeman, M**. (2020). Stakeholders perceptions to sustainable urban freight policies in emerging markets. **Transportation Research Part A: Policy and Practice**, 132, 329-348.
  - Amaya, J., **Delgado-Lindeman, M**., Arellana, J., & Allen, J. (2021). Urban freight logistics: What do citizens perceive?. **Transportation Research Part E: Logistics and Transportation Review**, 152, 102390.

Achievements of competences

International scientific publications

- Conferences:
  - Encuentro Internacional de Doctorandos en Ingeniería Civil 2021 (EIDEIC 2021).
  - XXI Congreso Panamericano de transporte y logística. Agosto 2021. Sociedad panamericana de transporte y logística.
  - Encuentro Internacional de Doctorandos en Ingeniería Civil. Noviembre 2021. Universidad Distrital Francisco José de Caldas, Bogotá D. C., Colombia.
  - 11avo Foro Gobernación Bolívar. “Puertos, desarrollo y sostenibilidad: Prosperidad para todos en el Departamento de Bolívar". Septiembre, 2021.

Working Papers

Output of the Research

Understanding parking behaviour of freight and passenger vehicles considering driving attitudes through latent class models.

Optimization approach to assign the available parking spaces to the different users in urban areas.

Colaboratives papers

Delivery Drivers Preferences to Parking in Urban Areas with Amaya, J. (Pennsylvania State University) and Encarnación, T. (University of Missouri-St. Louis).

Administrative information

Submission of thesis

It is estimated for the late of 2022.

International mobility

SUM+ AB. Sustainable Mobility & Railways Engineering. (Since April 2021).

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Thank you!