



Big Data Analytics for Passenger-Centric ATM

Understanding Door-to-Door Travel Times from
Opportunistically Collected Mobile Phone Records

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Founding Members



New opportunities



Aviation passenger
intelligence solutions



Official data



BigData4ATM

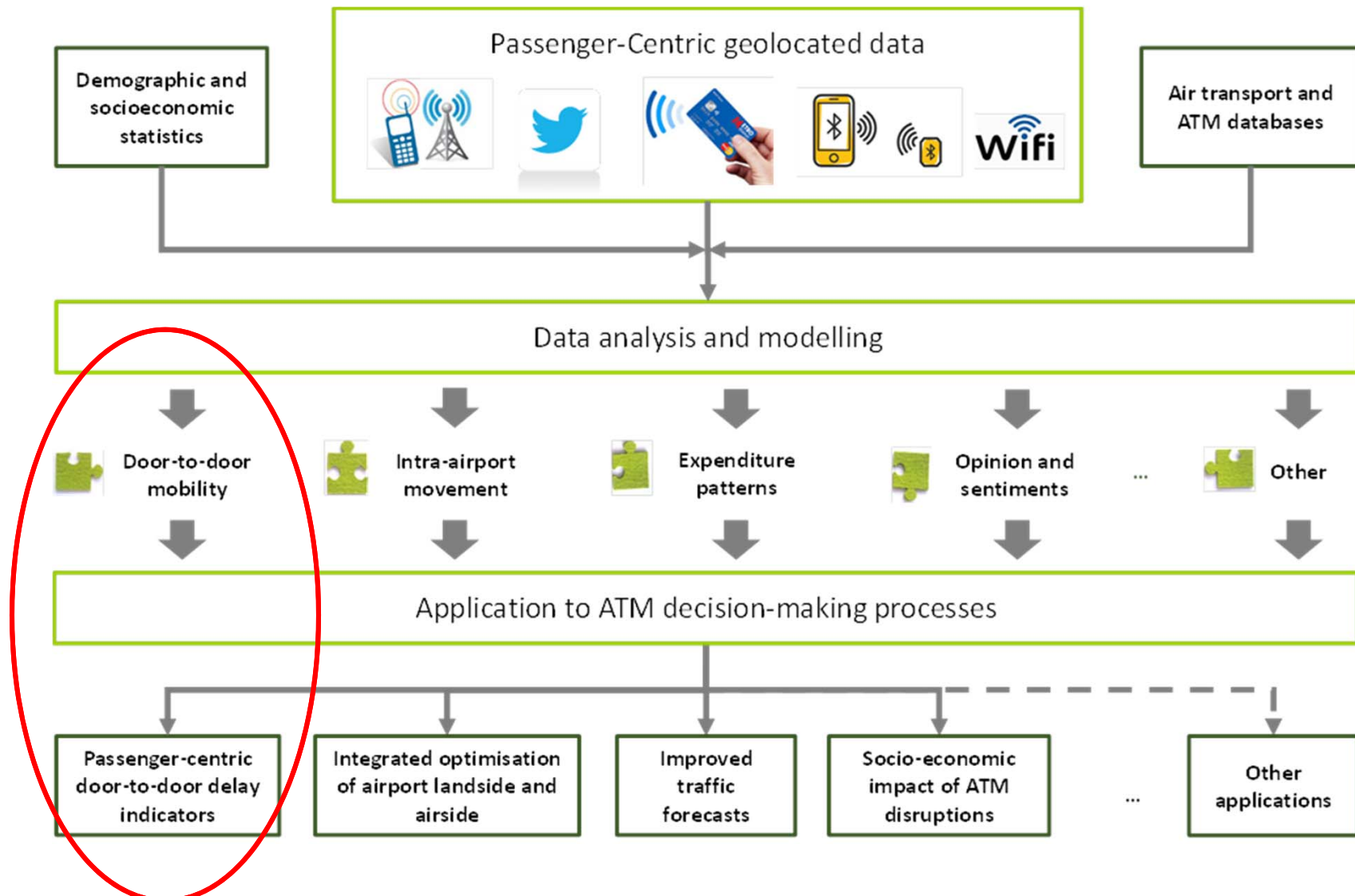


The goal of BigData4ATM is to investigate how different **passenger-centric geolocated data** coming from smart personal devices can be analysed and combined with more traditional demographic, economic and air transport databases to extract relevant information about **passengers' behaviour**, and to study how this information can be used to inform air transport and ATM decision making processes

- H2020 project - SESAR Exploratory Research
- Coordinator: Nommon
- Partners: IFISC, Fraunhofer, Hebrew University of Jerusalem, ISDEFE
- Start date: May 2016, duration: 24 months

<http://www.bigdata4atm-sesar.eu/>





Case Study



Introduction

Scope and Objectives

Evaluate the potential of mobile phone records to extract information about passengers' door-to-door mobility.

- Door-to-door origins and destinations
- Door-to-door travel times
- Duration of each leg of the trip

Temporal scope: July 2016

Geographical scope: Spanish domestic passengers that arrive to Madrid airport

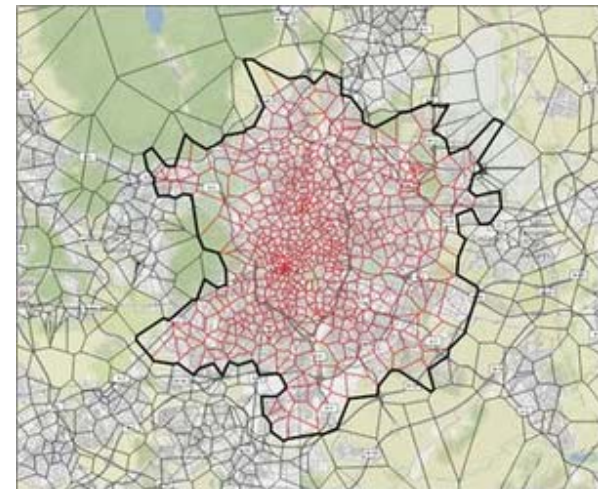
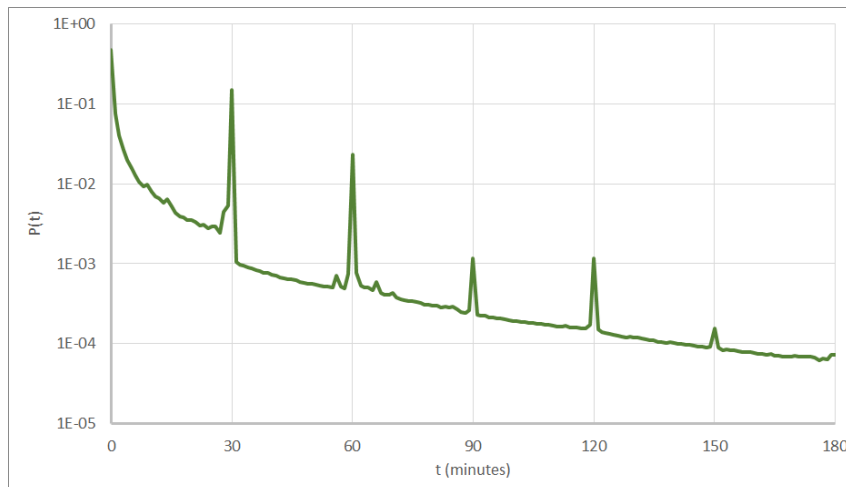
Datasets

- Anonymised call detail records (CDRs) provided by Orange Spain
- Data from Google Maps Directions API
- Flight durations from DDR 2 data

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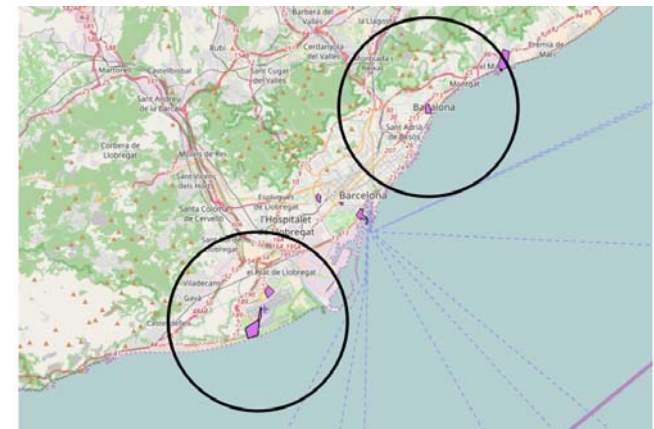
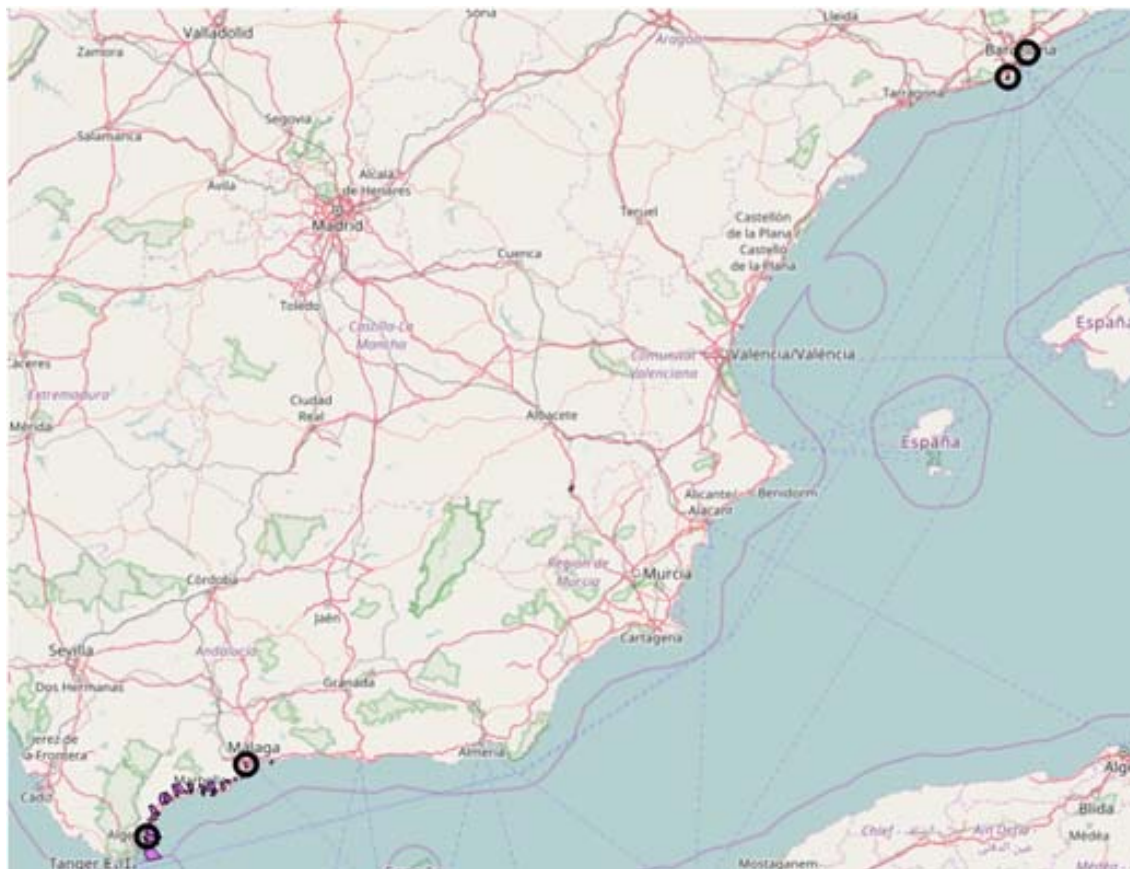
Anonymised mobile phone records (CDRs)

- Spatio-temporal data: time and cell tower to which the user is connected every time an event occurs
- Sociodemographic data for each user (age and gender)
- Sample of around 20% of the total population



Case Study

What we see



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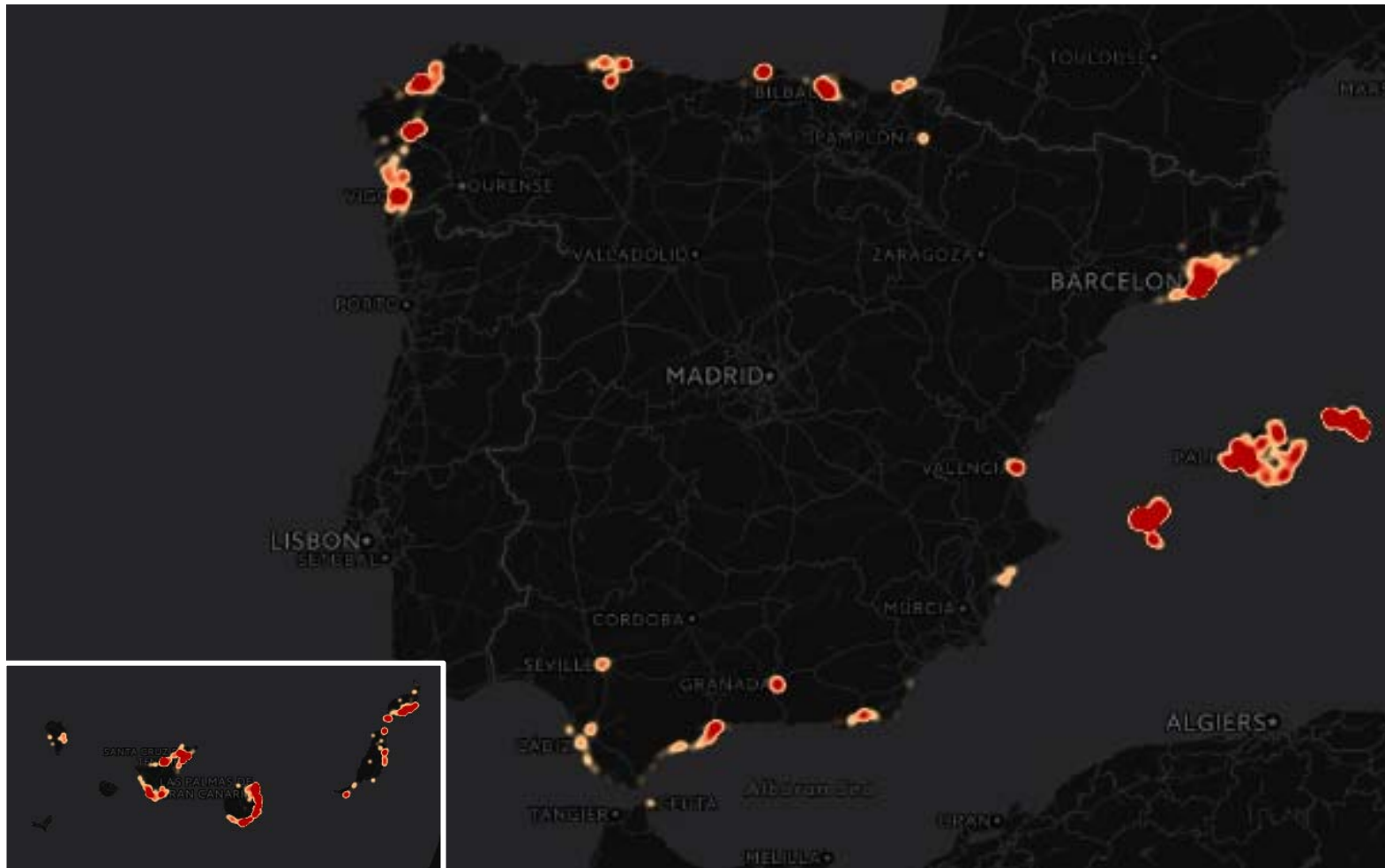


Methodology

- Sample construction ←
- Identification of users' home areas
- Generation of activity-travel diaries
- Determination of target passengers
- Travel times adjustment
- Expansion of the sample to the total population
- Extraction of indicators

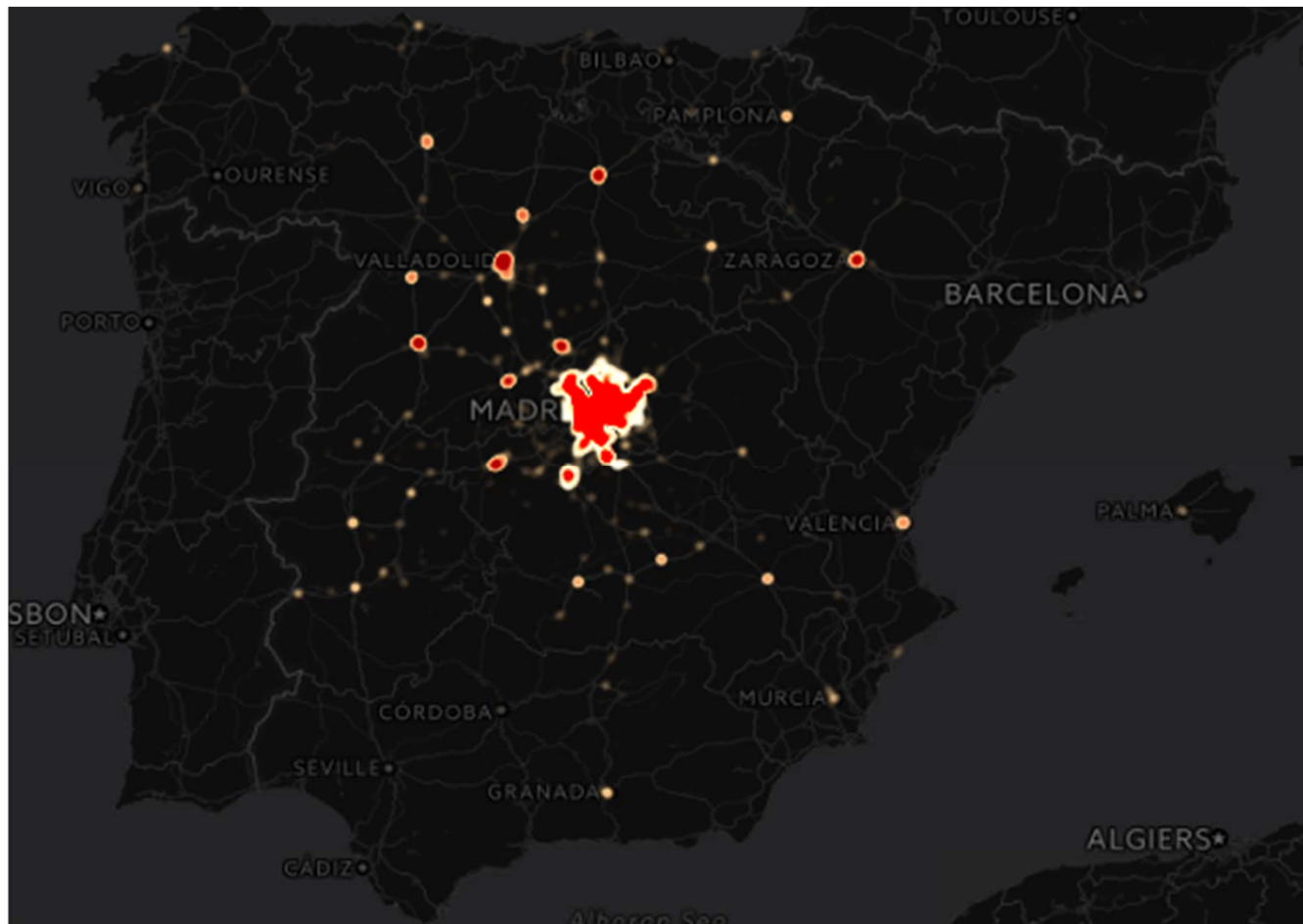
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Results – D2D origins



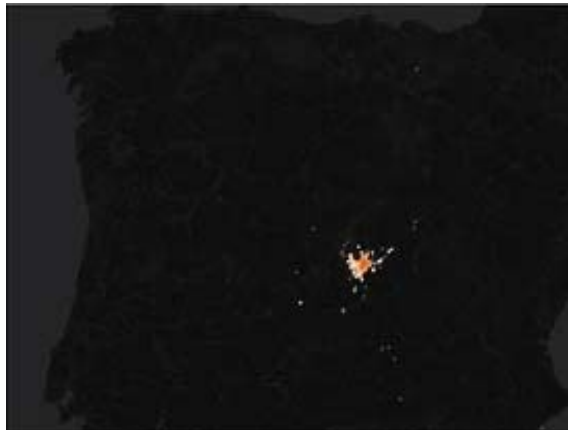
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Results – D2D destinations

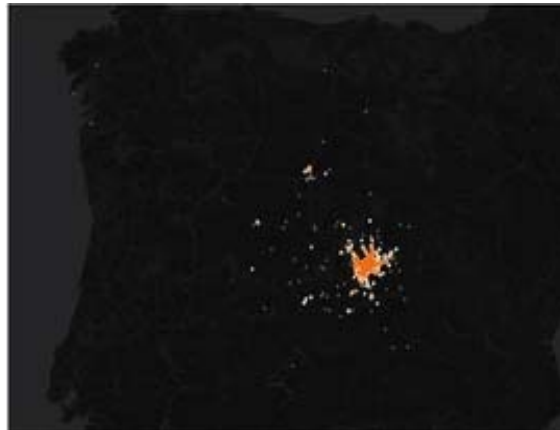


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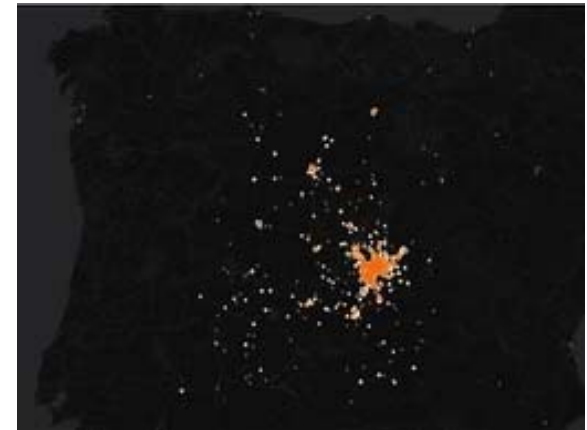
Results – D2D destinations



A Coruña



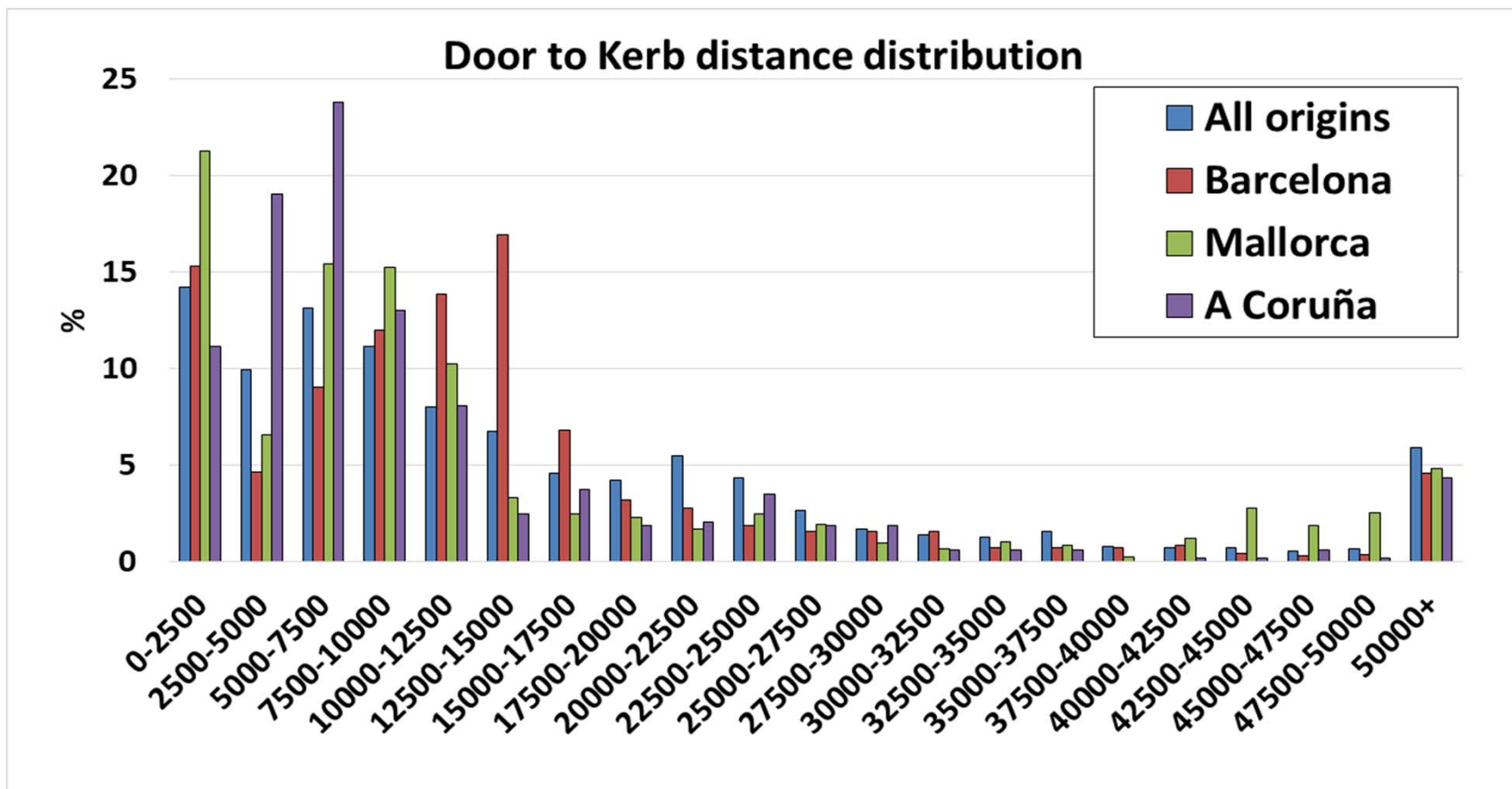
Barcelona



Palma

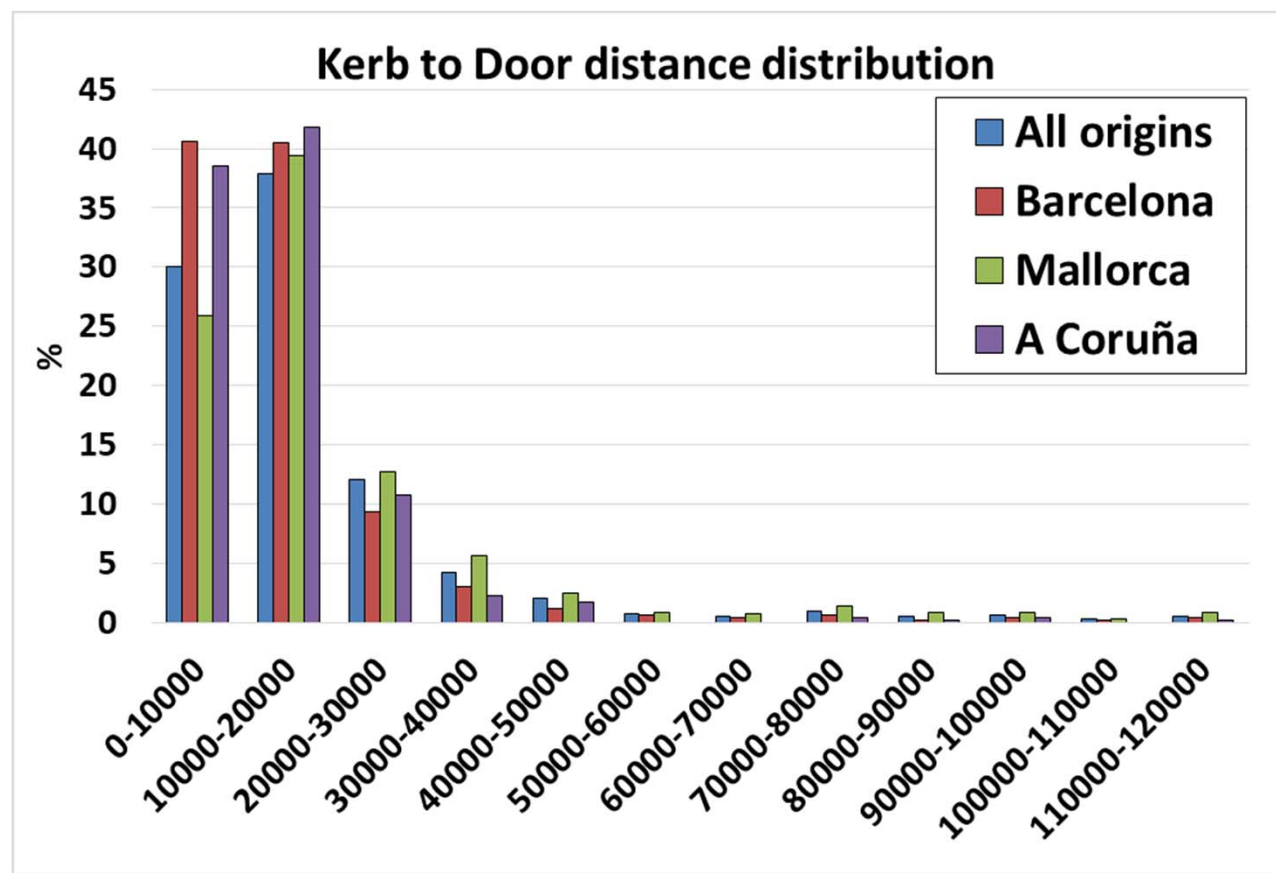
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Results – Door to kerb distance distribution



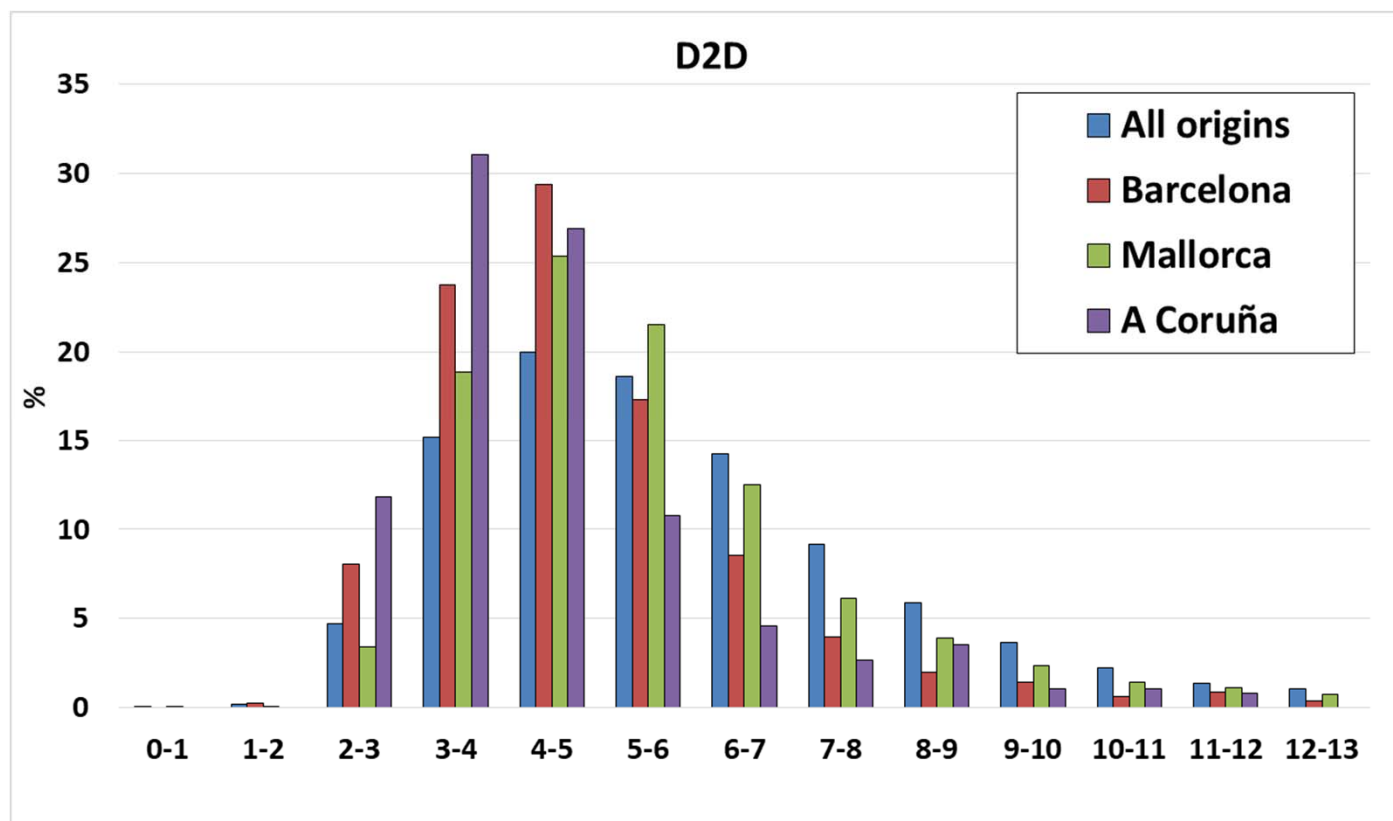
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Results – Kerb to door distance distribution



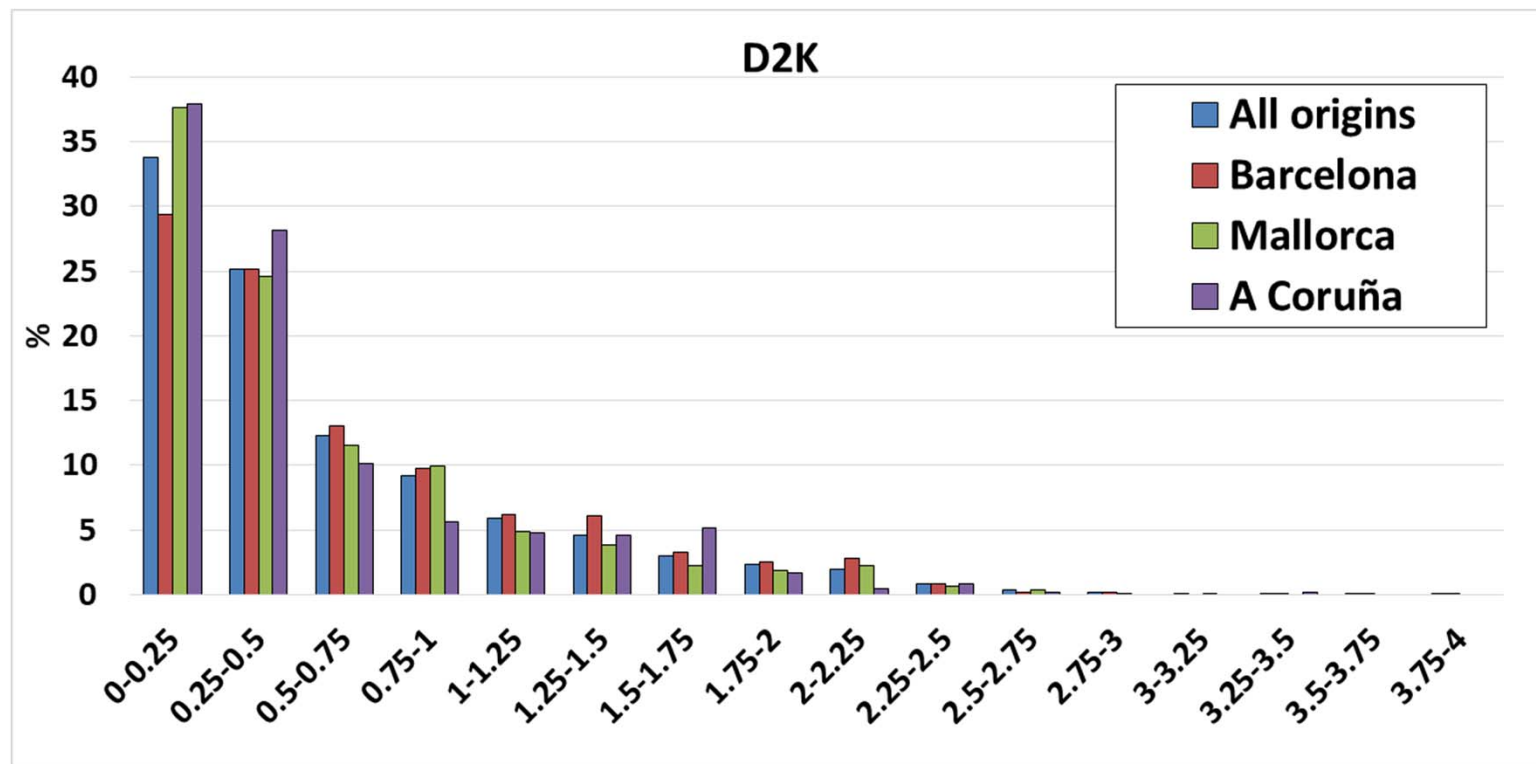
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Results – Door to door travel time distribution



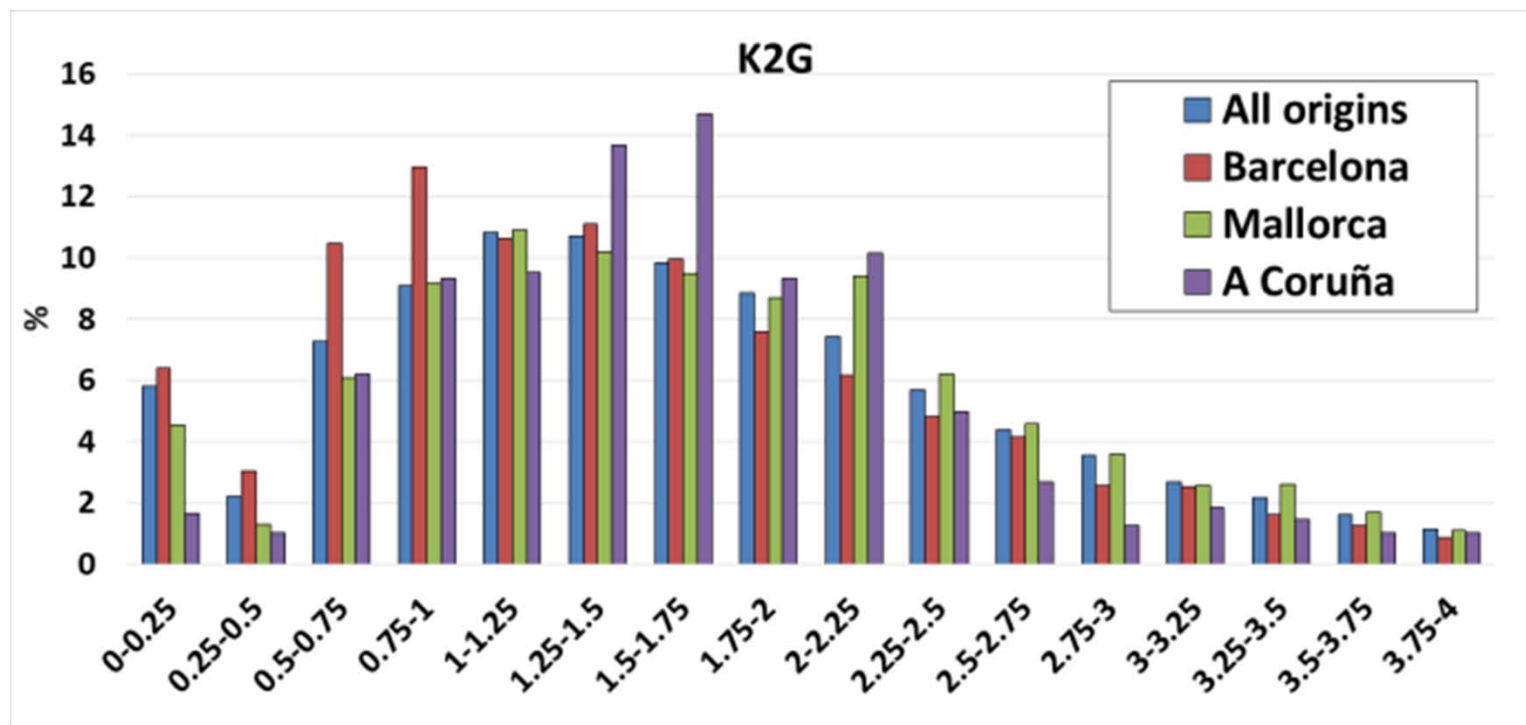
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Results – Door to kerb travel time distribution



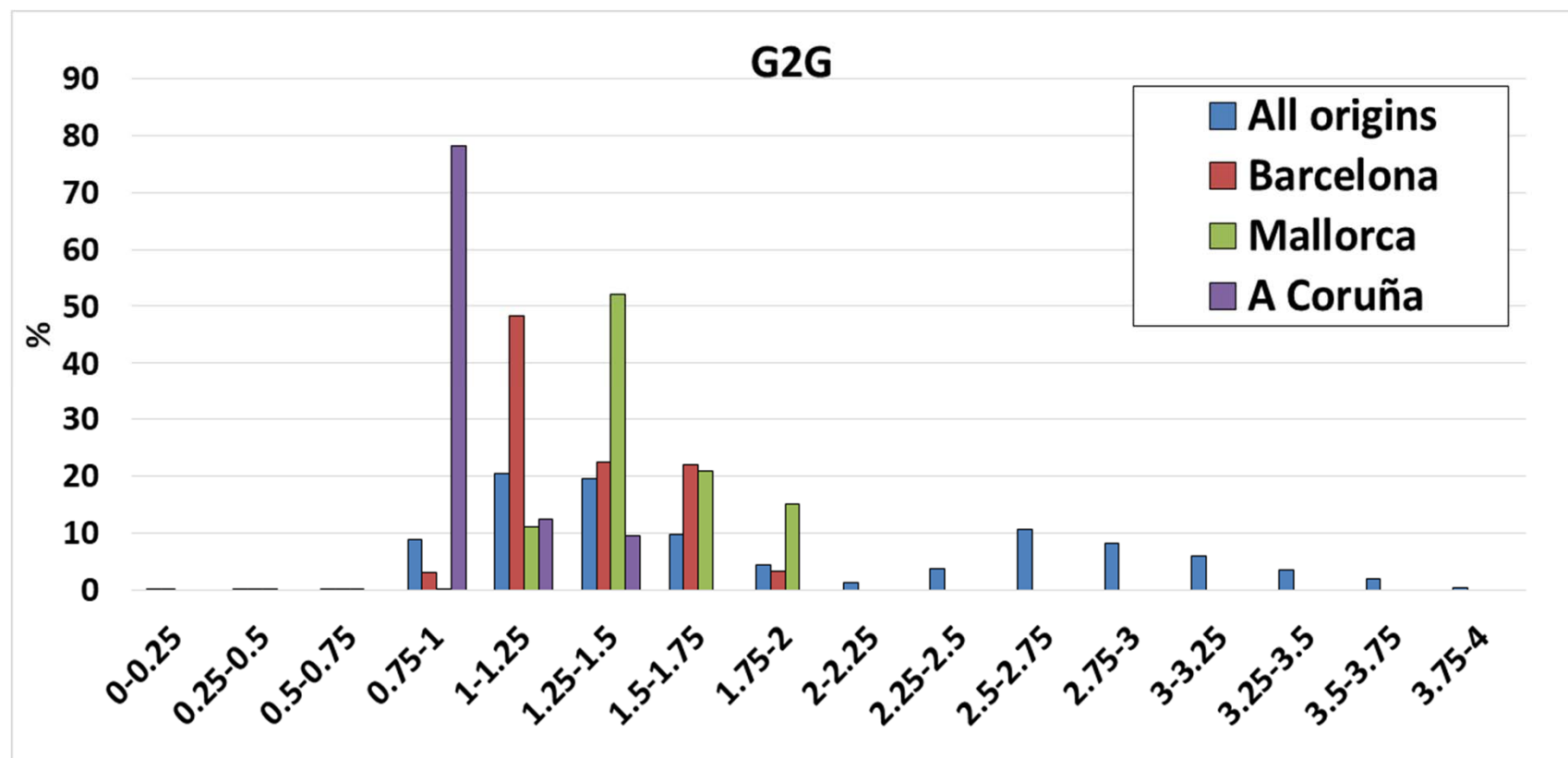
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Results – Kerb to gate travel time distribution



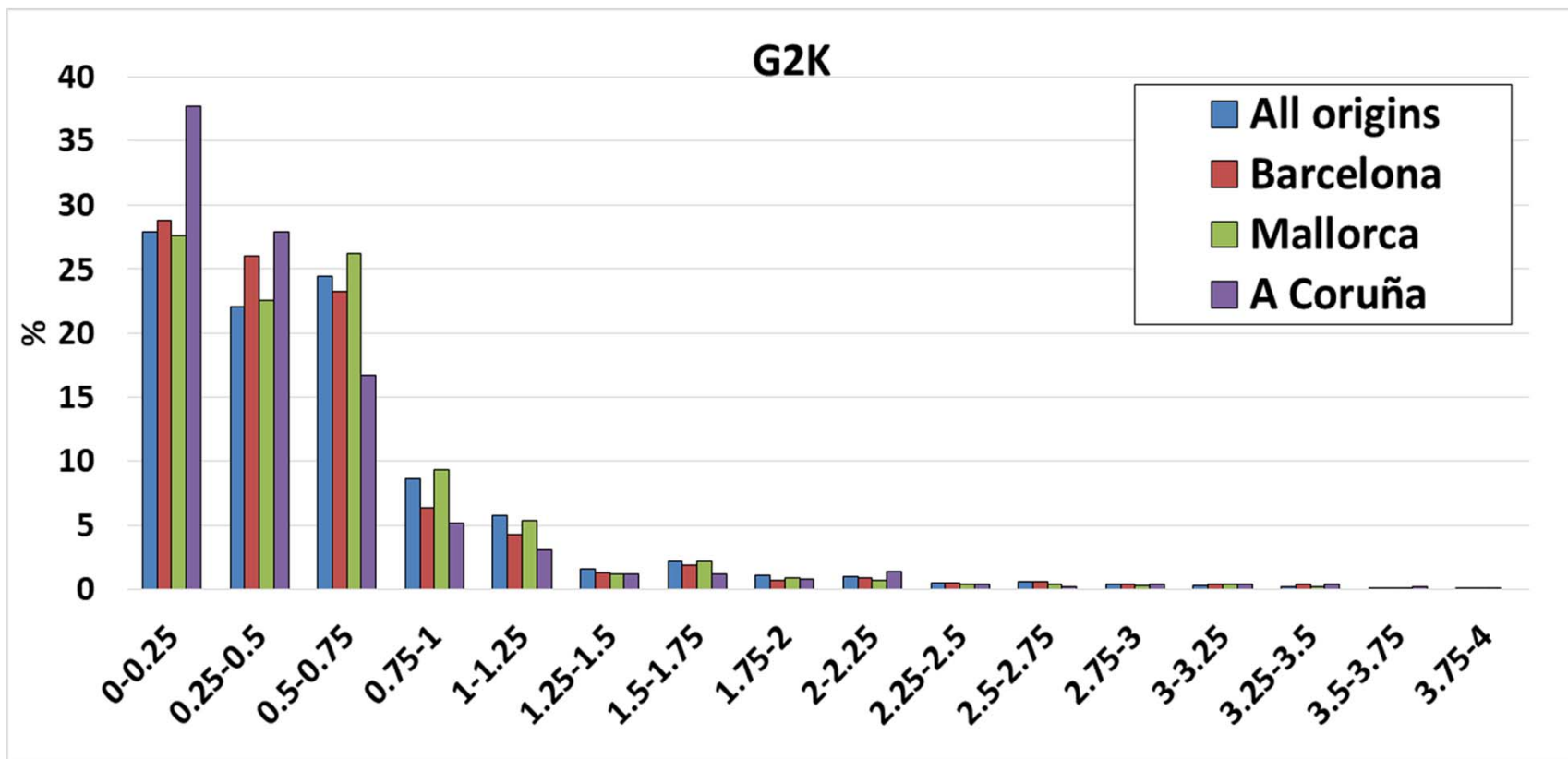
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Results – Gate to gate travel time distribution



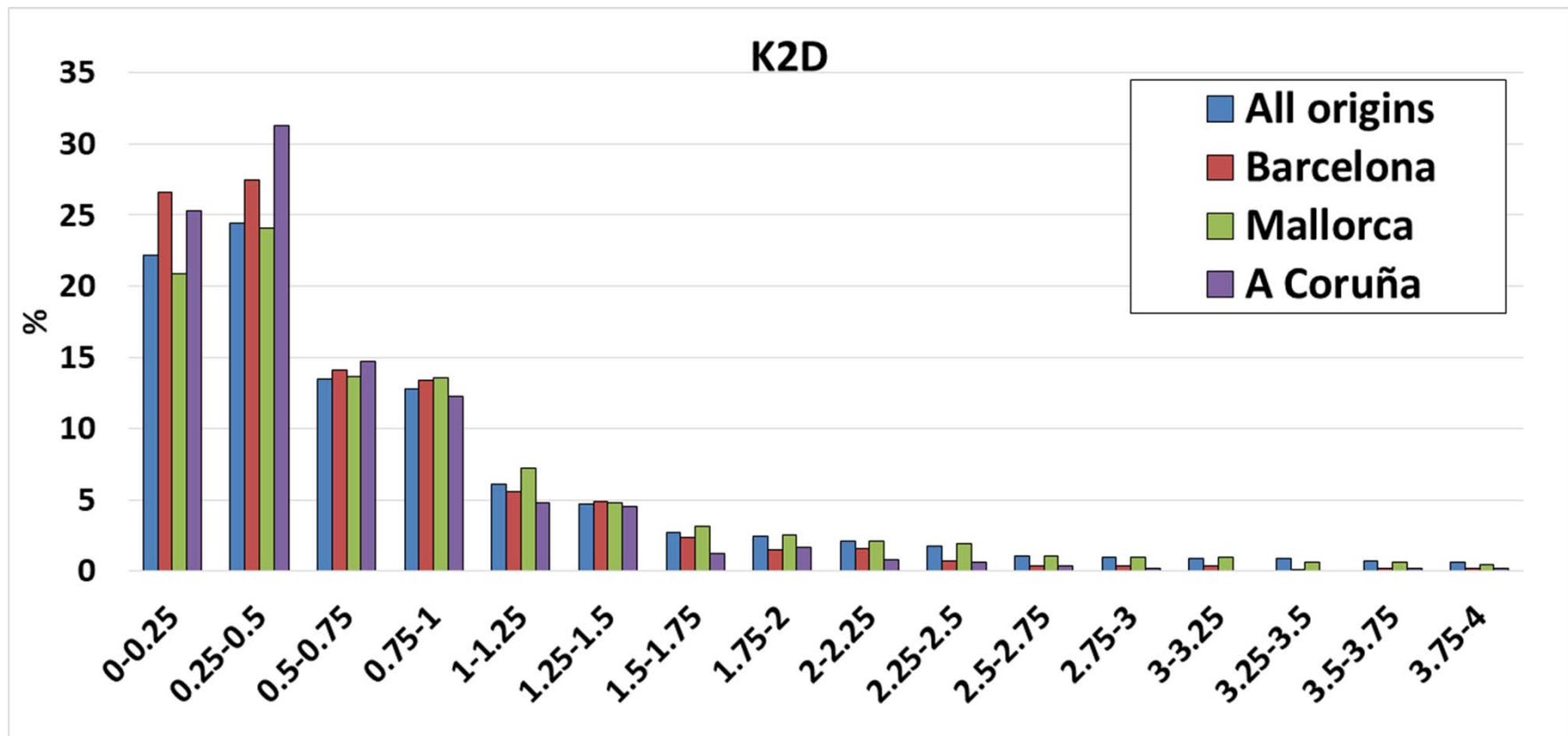
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Results – Gate to kerb travel time distribution



Case Study

Results – Kerb to door travel time distribution



Case Study



Conclusions

- Results show that mobile phone data, when adequately analysed, can be a valuable source of fine-grained passenger behavioural information.
- Different types of airport/passengers were identified, leading to different D2D travel times and catchment areas behaviour.
- Different strategies might be needed in order to achieve the 4h D2D goal.

Case Study



Future research

- Extend the analysis to other airports.
- Extend the analysis for different periods.
- Analyse the impact of disruptions. Impact of air traffic delays in D2D travel times.
- Evaluate strategies for achieving the 4h D2D target.
- Look for alternative data sources with international coverage.



Big Data Analytics for a Passenger-Centric Air Traffic Management System

Thank you very much
for your attention!



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Founding Members



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