CAMERA

Coordination and support Action for Mobility in Europe: Research and Assessment

European mobility goals

CAMERA Performance Framework

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21 October 2021

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant Agreement n° 769606

CAMERA's Objectives

Coordination and support action (CSA) for mobility in Europe

Research questions

- Are EU research and initiatives aligned with the long-term goals in the (air) mobility sector?
- What are the research challenges to achieve the mobility goals envisioned for the future?
- How can synergies with other transport domains be fostered?

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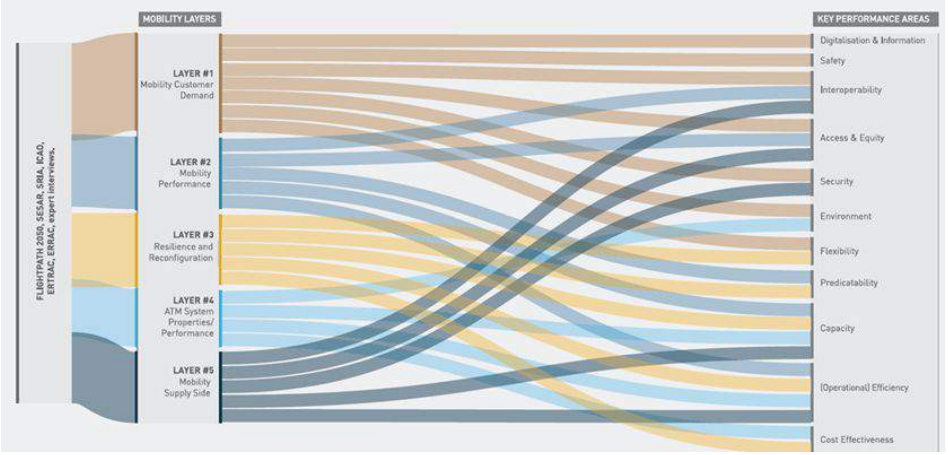
The European Mobility Strategies

Goals and challenges

- Meeting societal and market needs outlined in
  - Flightpath 2050 goals
  - ACARE SRIA Action Areas
  - EC aviation strategy
  - etc.
- Translated into **CAMERA Performance Framework with five mobility layers, KPAs and KPIs**
- Published in 2018

Passenger-oriented, seamless and efficient door-to-door mobility paradigm



Layer #1 Creating an individualised & seamless mobility system for everyone

Layer #2 Improving the overall performance of the mobility system

Layer #3 Improving the resilience & re-configuration of the mobility system

Layer #4 Providing safe & efficient ATM services

Layer #5 Designing & implementing an integrated, intermodal transport system

Key Performance Areas

Adapted from ICAO by CAMERA

Flexibility

- Passengers using different modes on-demand for a given route according to the personal situation (MaaS)
- Creating a resilient transport system

Predictability

- Predict possible disturbances and consequences
- Allow enhanced travel planning that reduces actual travel times

Digitalisation & Information*

- Real-time and high quality travel information that helps to 'free the mind' of passengers pre, during, and post journey
- Allow using travel time in a value-adding way

Environment

- Creating an environment-friendly mobility and air transport system by reducing greenhouse gas and other emissions
- Push of environment-friendly technologies, solutions and increased operational efficiency

Access & Equity

- Seamless, multimodal and inclusive surface transport to and from the airport
- Including also novel transport concepts

(Operational) -Efficiency

- Creating an optimised transport system in terms of costs, emissions and overall travel time along

Cost-Effectiveness

- ATM-related costs & passenger-orientated costs
- Including also efforts for creating a seamless and resilient mobility system

Interoperability

- Intermodal integration, alignment and data and information sharing across transport modes

Security

- Security standards affecting passengers and providers necessary to keep the transport system safe

Safety

- Technical and operational measures taken to reduce accidents and fatalities

Capacity

- Meeting passenger requirements at the required time and thus providing either sufficient capacity or using available capacity efficiently

Updating Performance Framework

New challenges ahead!

#MobilityStrategy

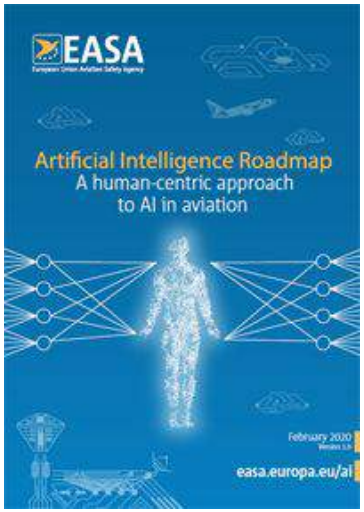
1) Creating a more sustainable future mobility system

2) Digitalisation and digital transformation

3) Leveraging the full potential of (shared) data and AI-models

4) Putting the passenger at the center

5) The possible long-term influence of the Covid-19-induced crisis



Images: easa.europa.eu (2020), European Commission (2019, 2020), imago images / Le Pictorium

The CORDIS Database

Searching through 40.000 projects

The CORDIS database

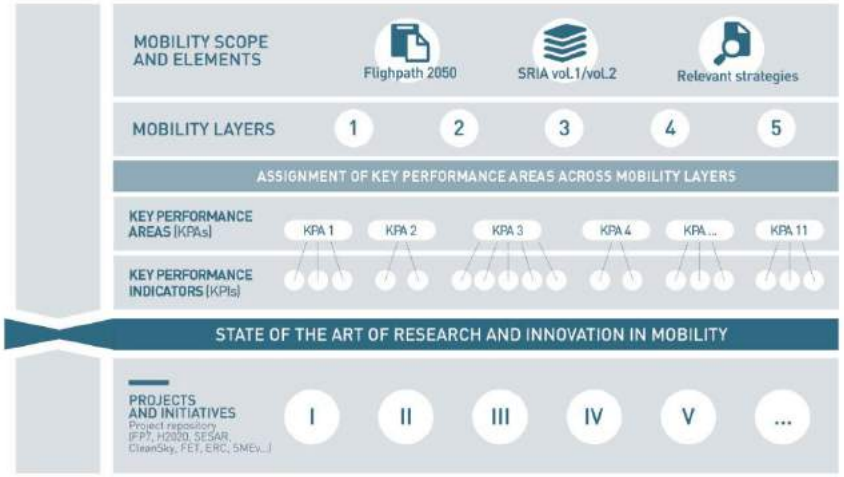
- **CORDIS** provides open-access information on all EU-supported R&D activities, including programmes, project details, results, and publications

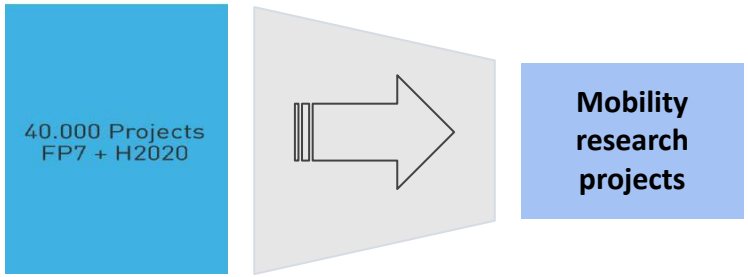
Approach and data used within the CAMERA project

- **Data-centered, automated AI-approach**
- Searching through 40.000 projects within CORDIS
- Using **textual data points**: title, abstracts, final report summaries, etc.
- Filtering out **926 mobility-relevant projects** within CORDIS
- Focusing on **H2020 & FP7 projects**

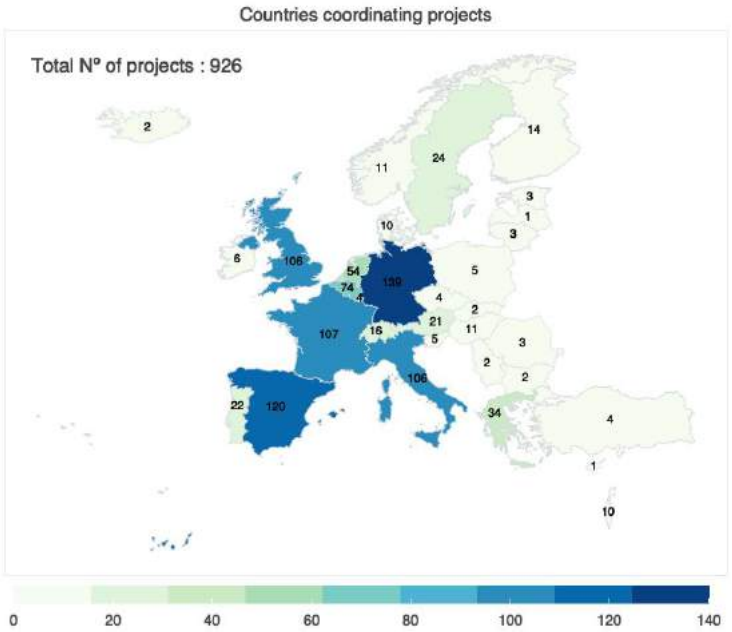
European Commission | CORDIS EU research results

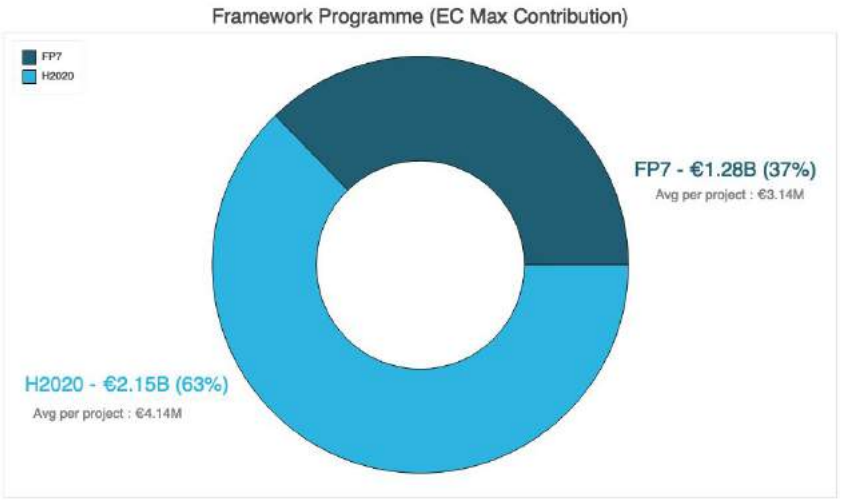
https://cordis.europa.eu/

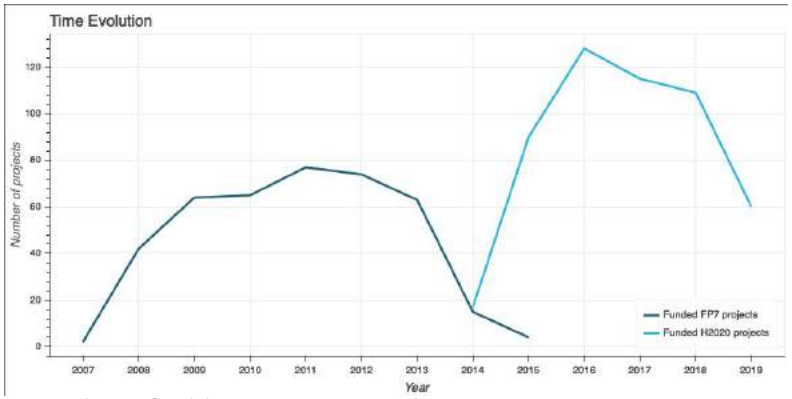




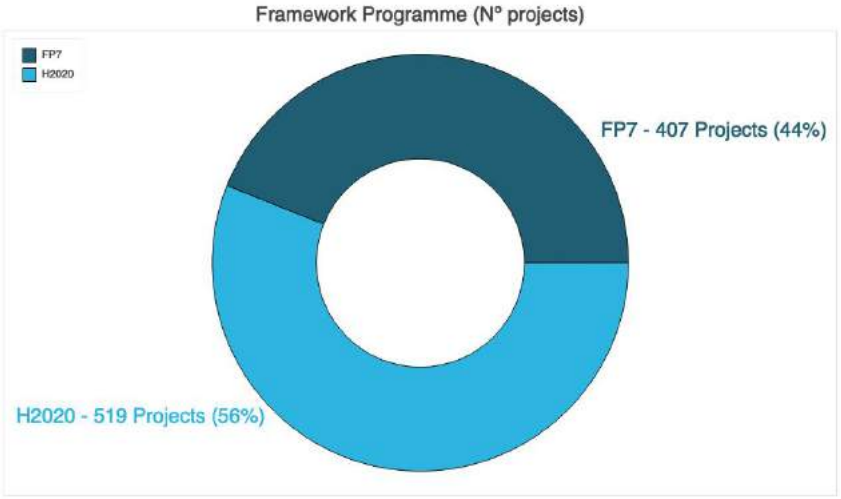
Starting with some Statistics







*Time evolution of mobility projects **starting** each year*



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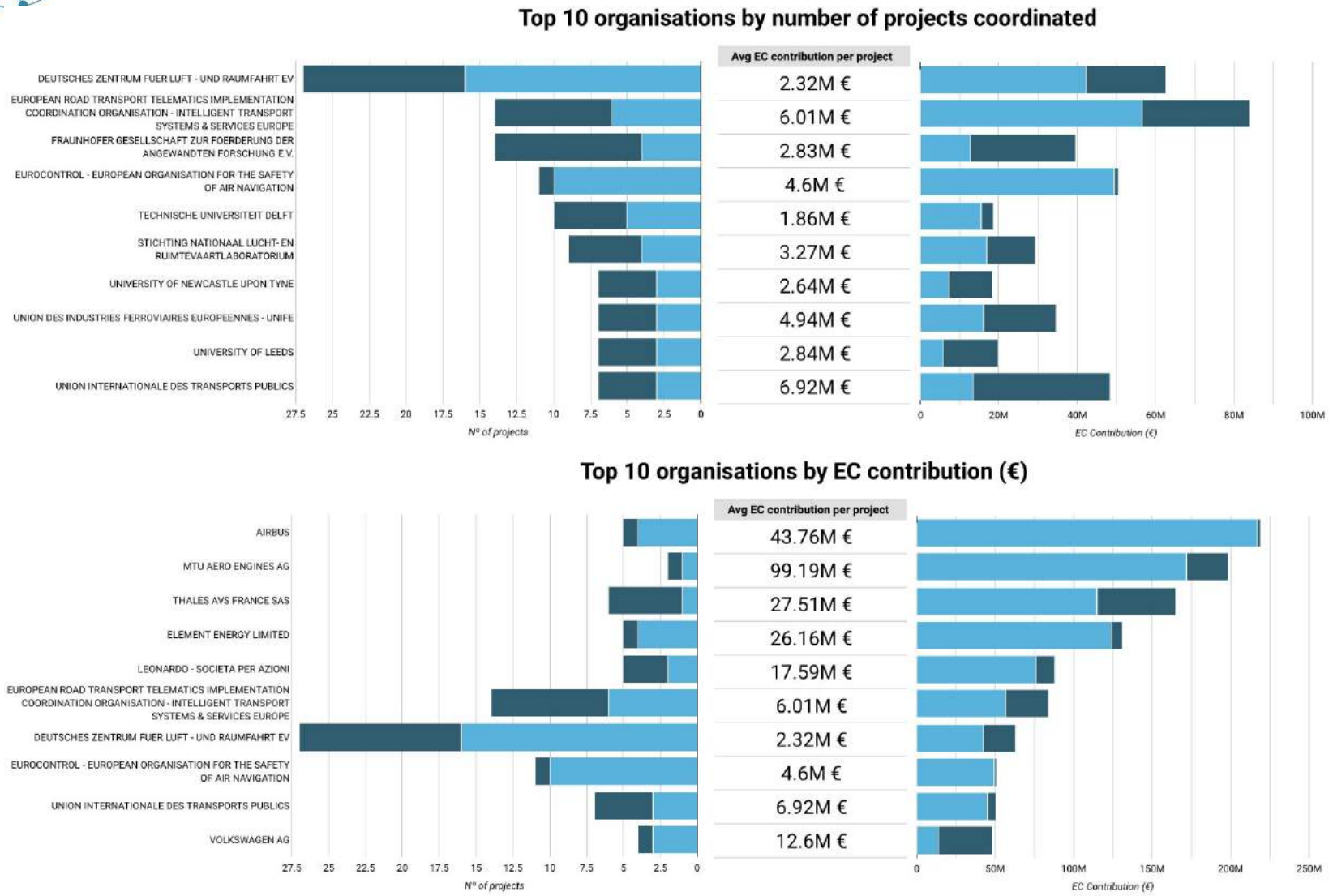

CAMERA

Coordination and support Action for Mobility in Europe: Research and Assessment

Looking for evidence in data:

Insights gathered on mobility research in Europe

Damir Valput, The Innaxis Foundation

21 October 2021

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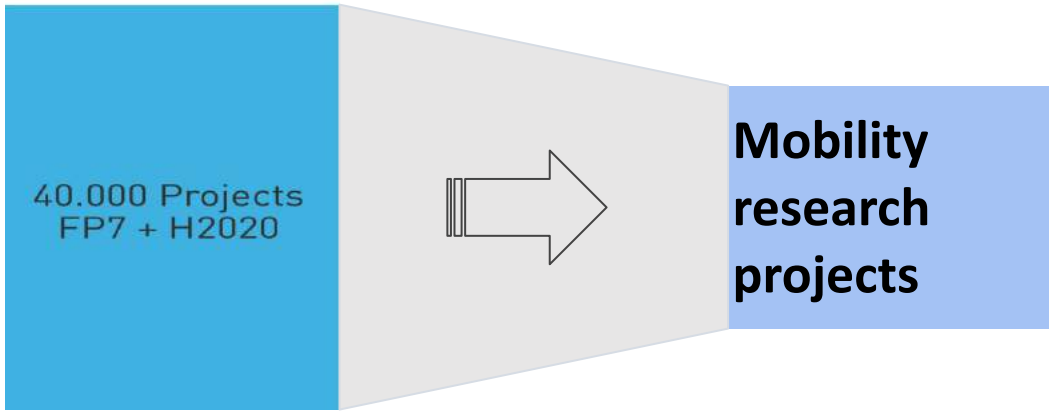
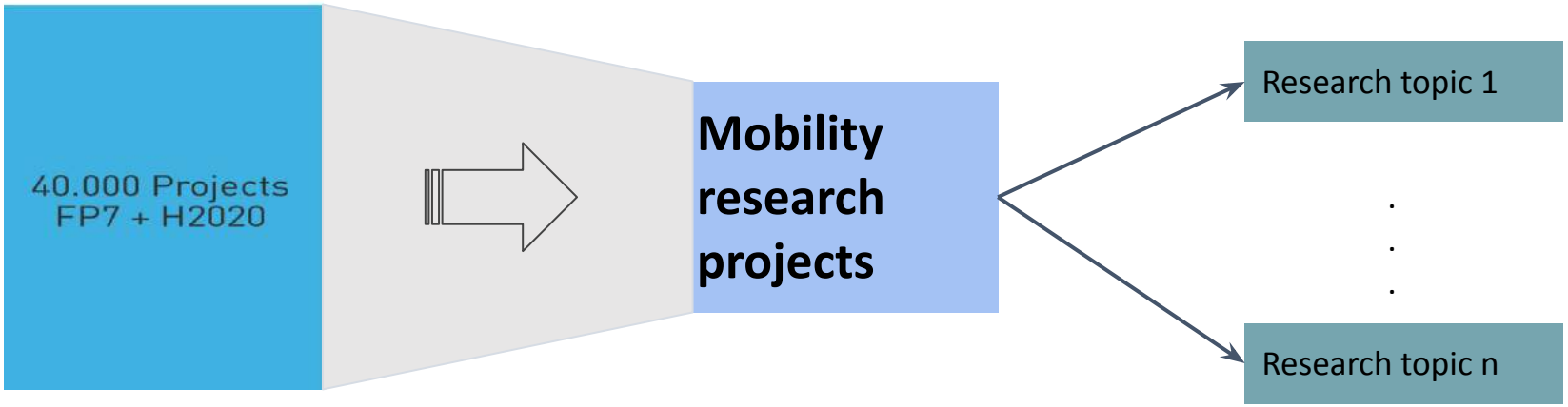
Artificial intelligence as a research "assistant"?

- Identification of **research themes** in a **large** corpus of unstructured textual information (926 mobility-relevant research projects)
  - Need to **automatise**
  - Use **AI to create knowledge** on mobility research landscape in EU



AI-powered model #1

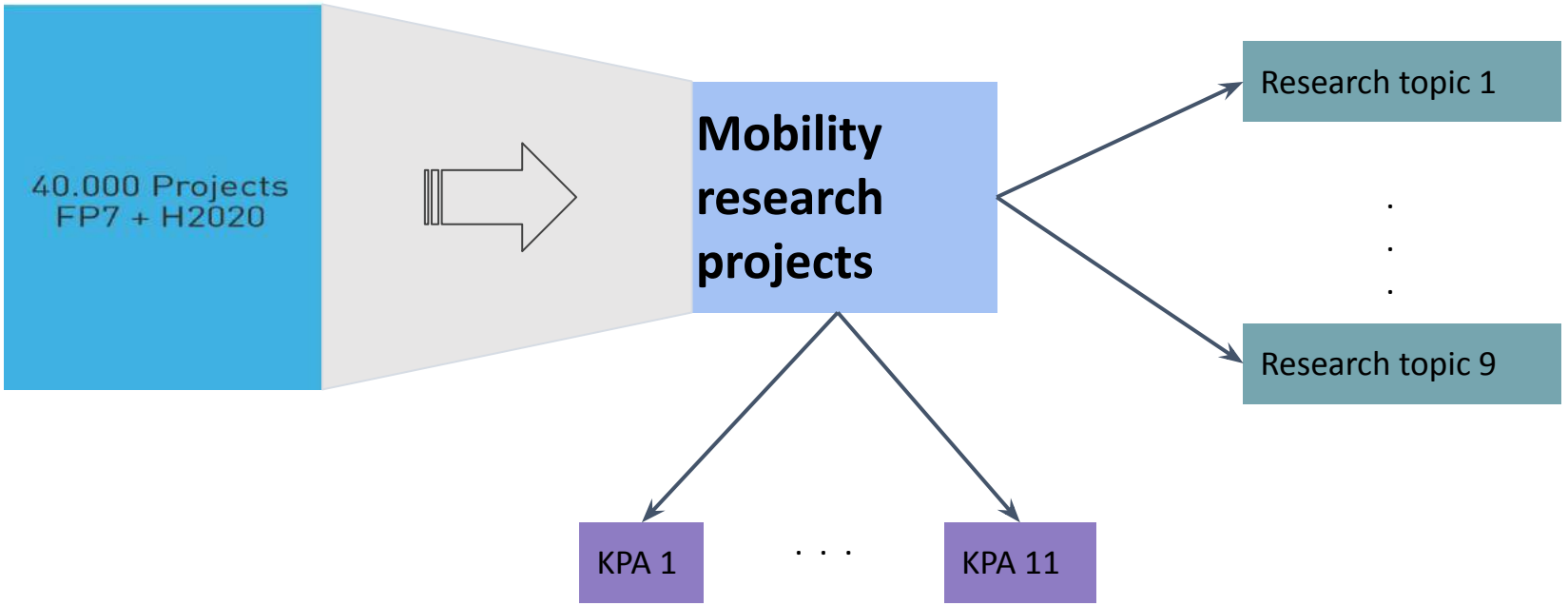
- Identification of **research themes** in a large corpus of 926 mobility-relevant research projects (textual information)



Most common research topics

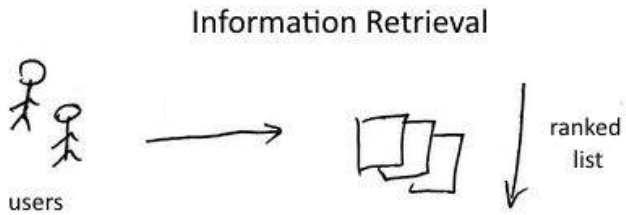
AI-powered model #2

- How do mobility projects align with the objectives defined in KPAs in PF?



Information retrieval

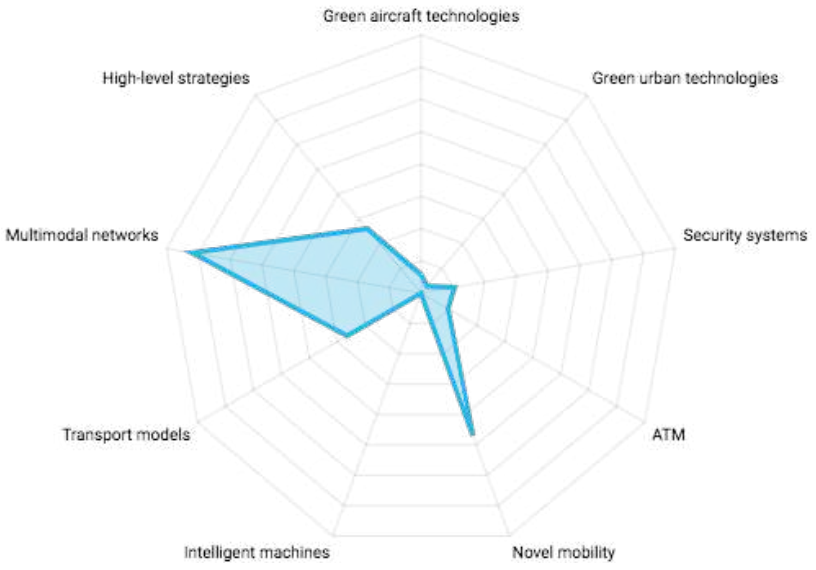
- Searches for **relevant information** within a collection of unstructured (textual) data
- Organises found information → **knowledge**



- Probabilistic model → **approximate matches**, not a solution
- Returns: **RELEVANT documents** in some order
  - retrieval function based on semantic similarity metrics

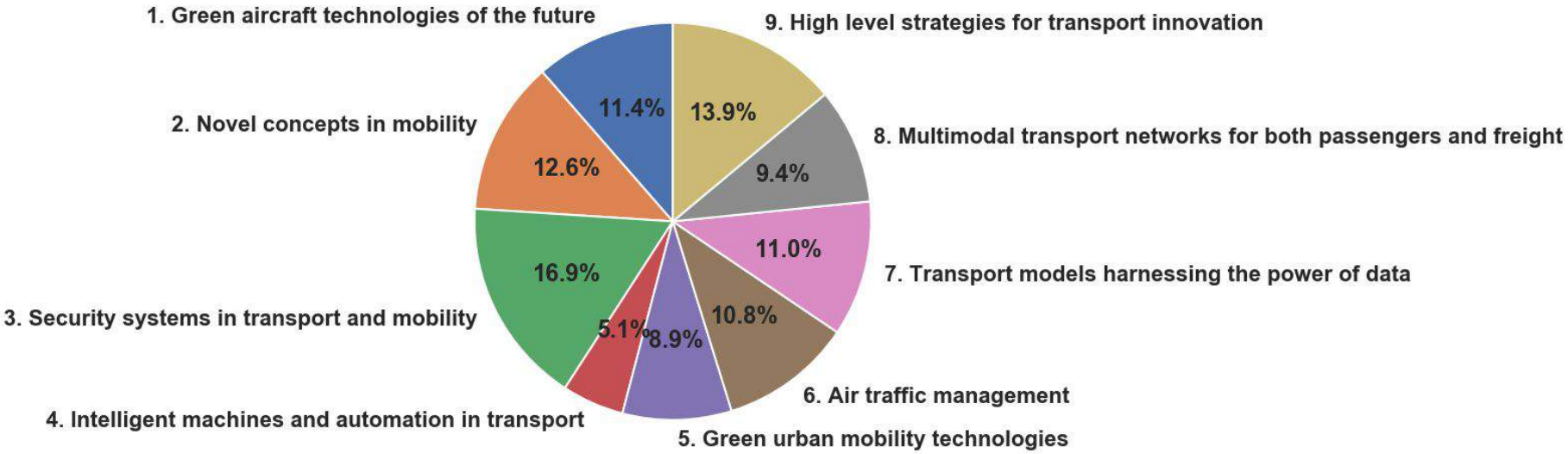
Mobility-relevant projects in two multidimensional spaces

Research topics

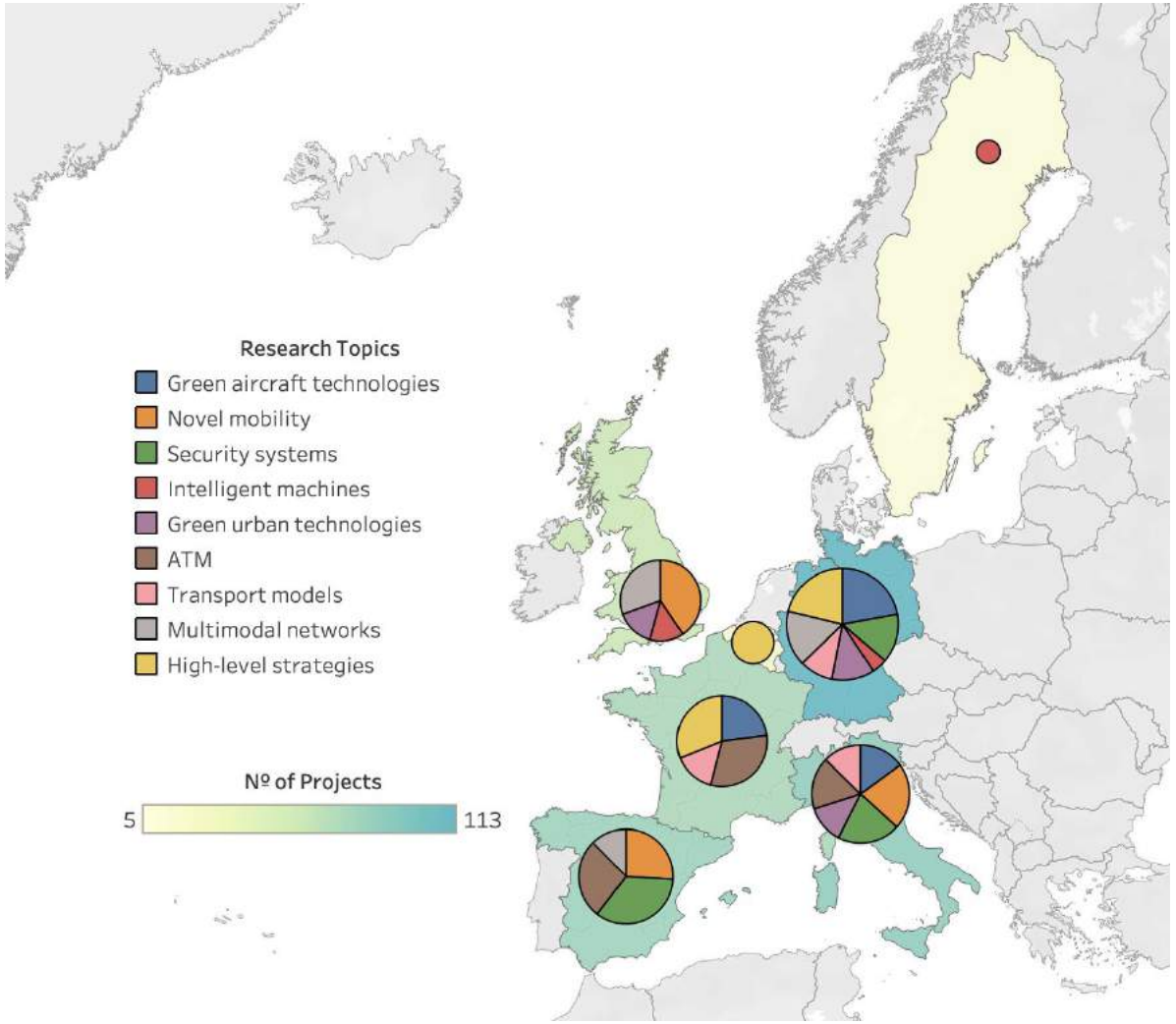


Key Performance Areas (KPAs)

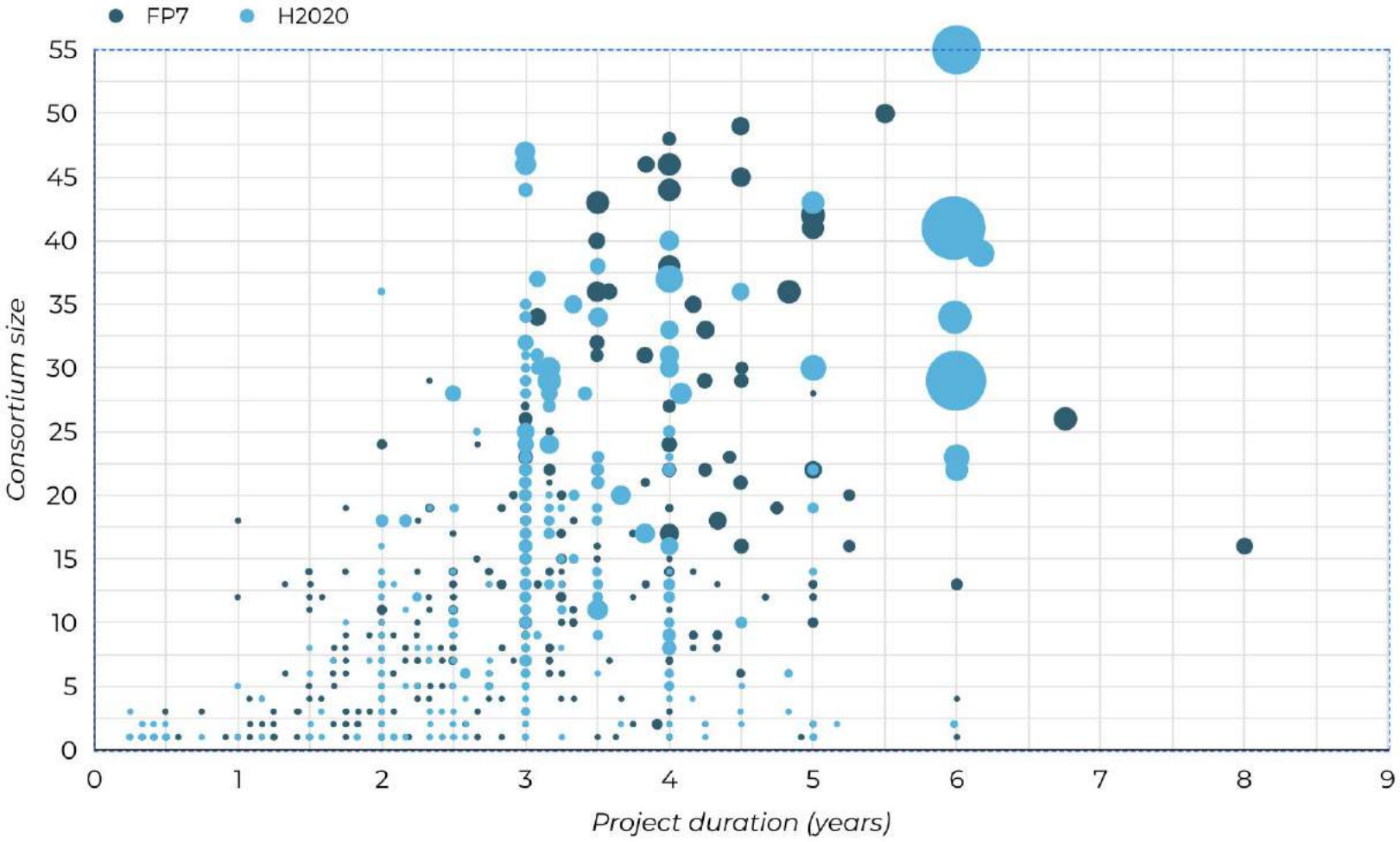
Research topics: representation in the dataset of mobility projects



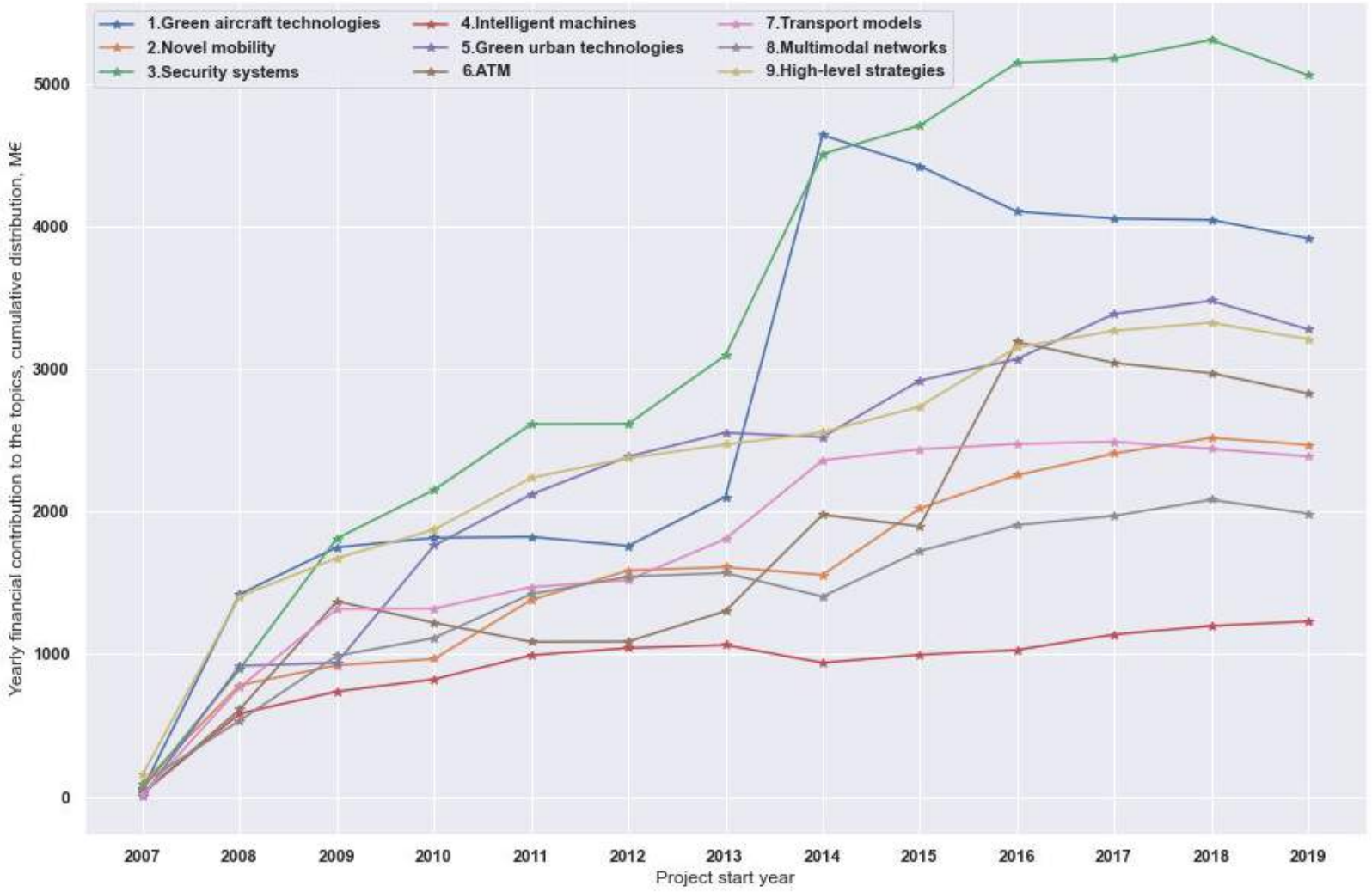
Geographical distribution



Correlational analysis

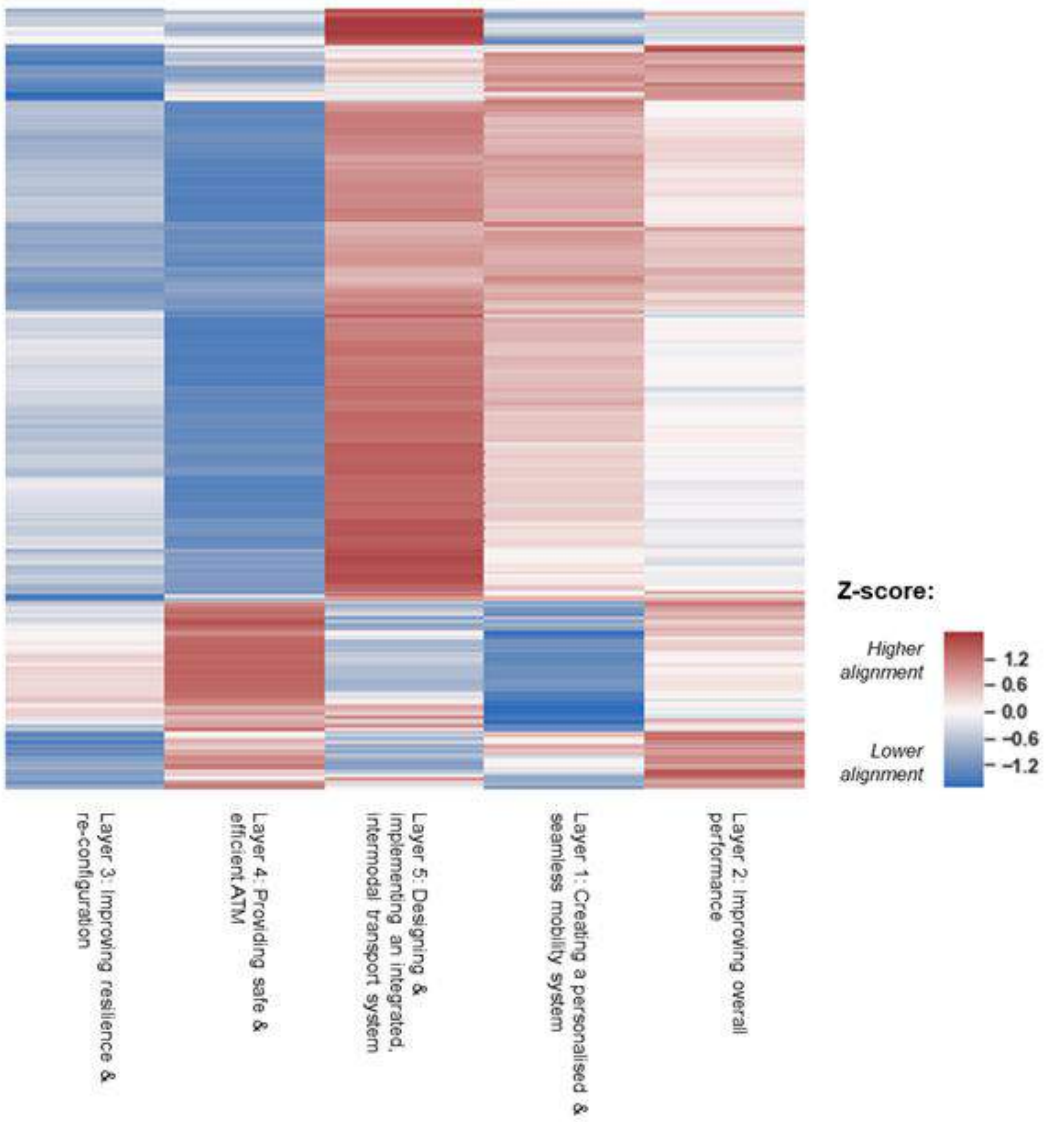


Trend analysis

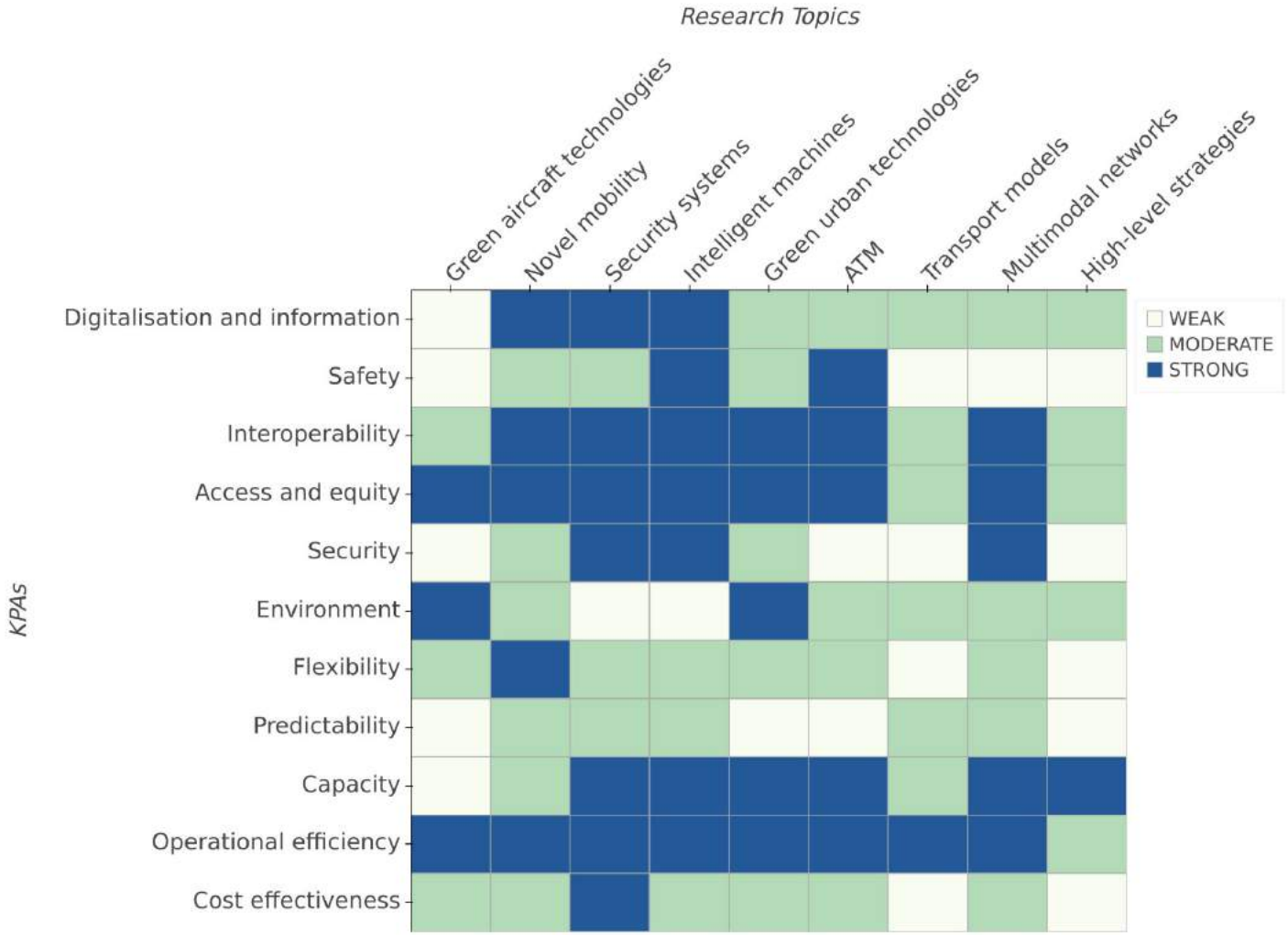


Understanding mobility research landscape: **Mobility layers**

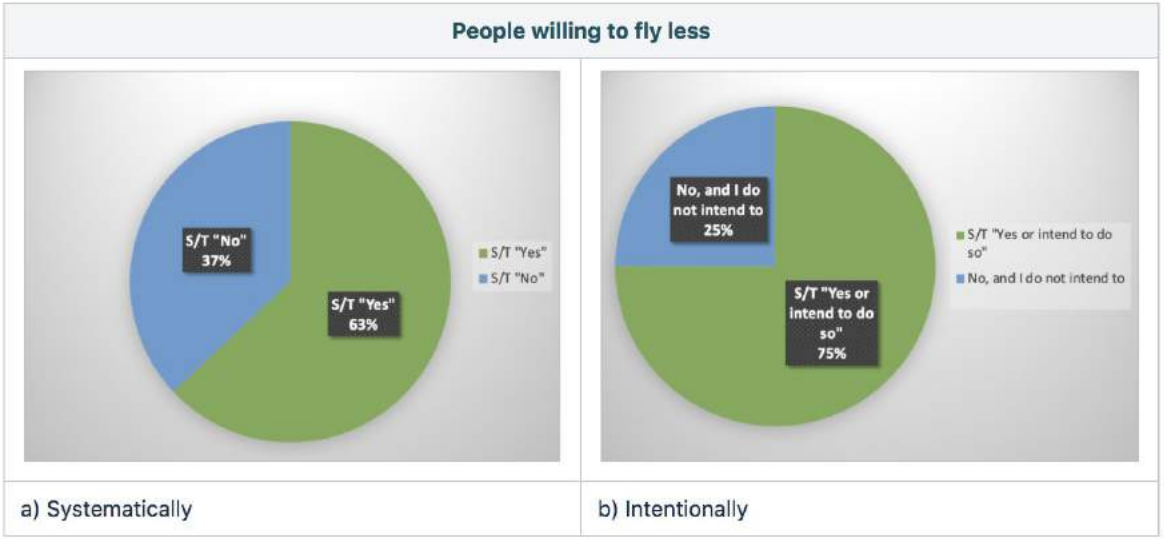
- Resilience: lower coverage
- Intermodal mobility layer objectives: high alignment with the project goals

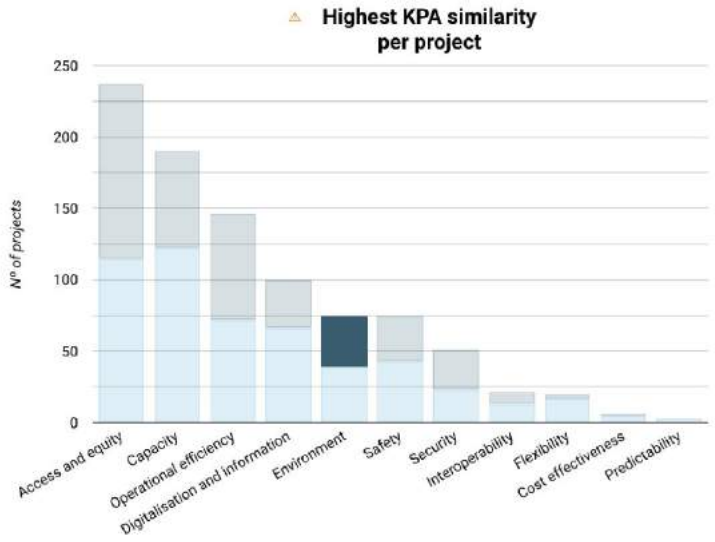


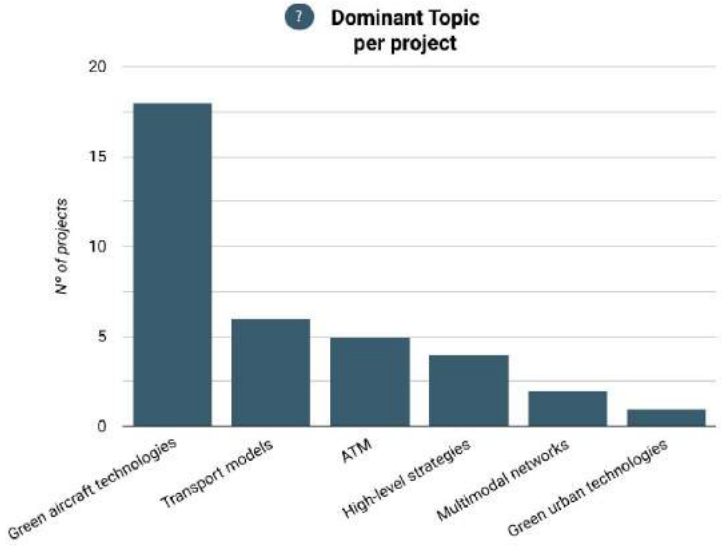
Marrying KPAs and research topics



Deep dive #1: Environment





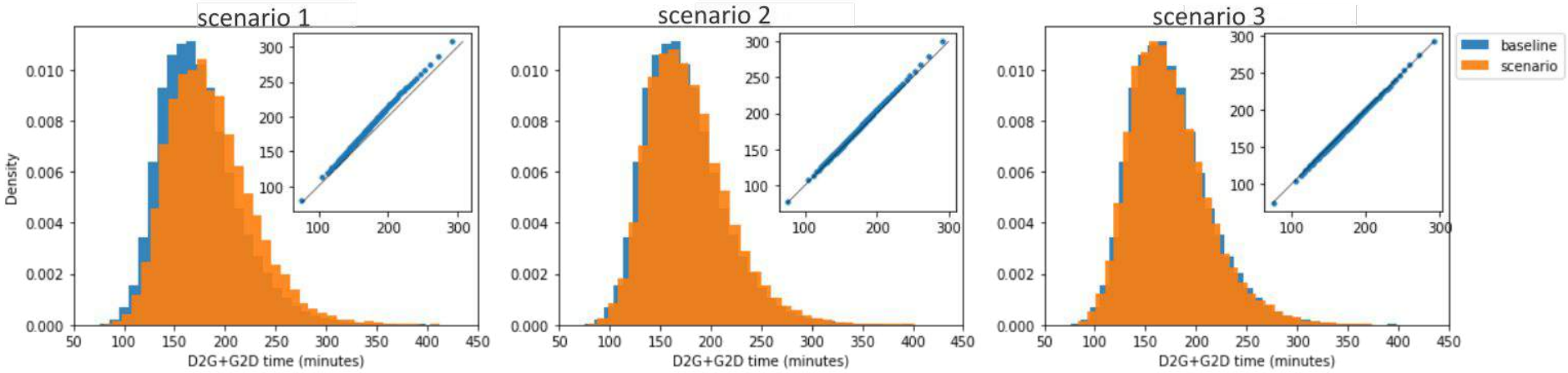


Deep dive #2: Digital transformation

Source: Google LLC "Google COVID-19 Community Mobility Reports"

Deep dive #3: Impact of Covid-19

Scenarios	Traffic Level	Parameters modified D2K/K2D	Parameters modified K2G	Parameters modified G2K
Scenario 1	12% of 2019	Airport access time via public/private transport (↓)	Immigration, buffer time (↑)	Immigration time (↑)
Scenario 2	45% of 2019	Same as Scenario 1		
Scenario 3	95% of 2019	Same as 2019		



Distributions of D2G+G2D times in the baseline (blue) and in the scenarios (orange). Insets: QQ-plot comparing the baseline and the scenario distributions.

Coffee break

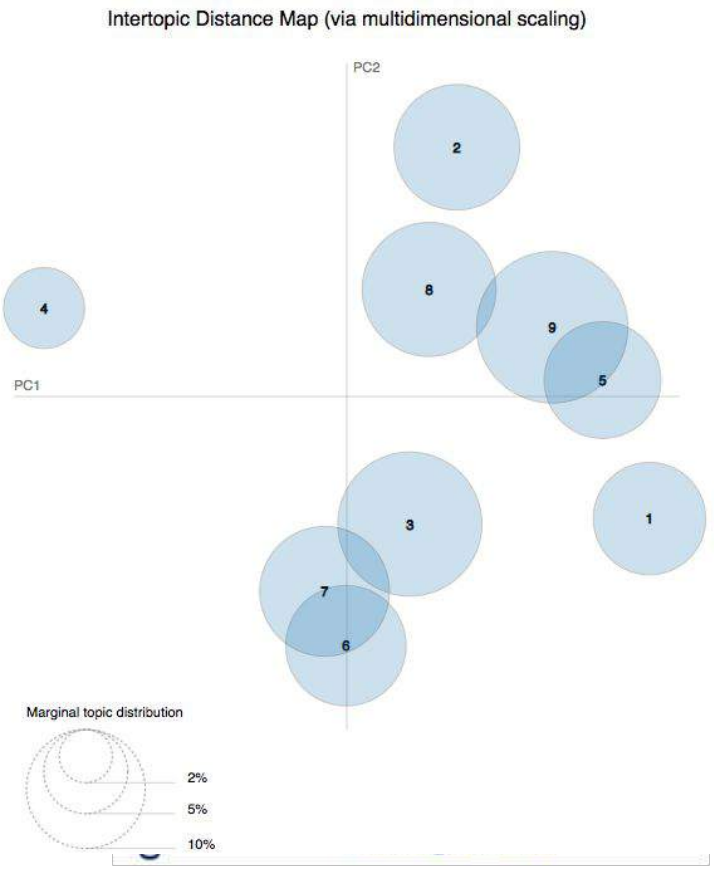
Thank you for your attention. Time for a coffee break!

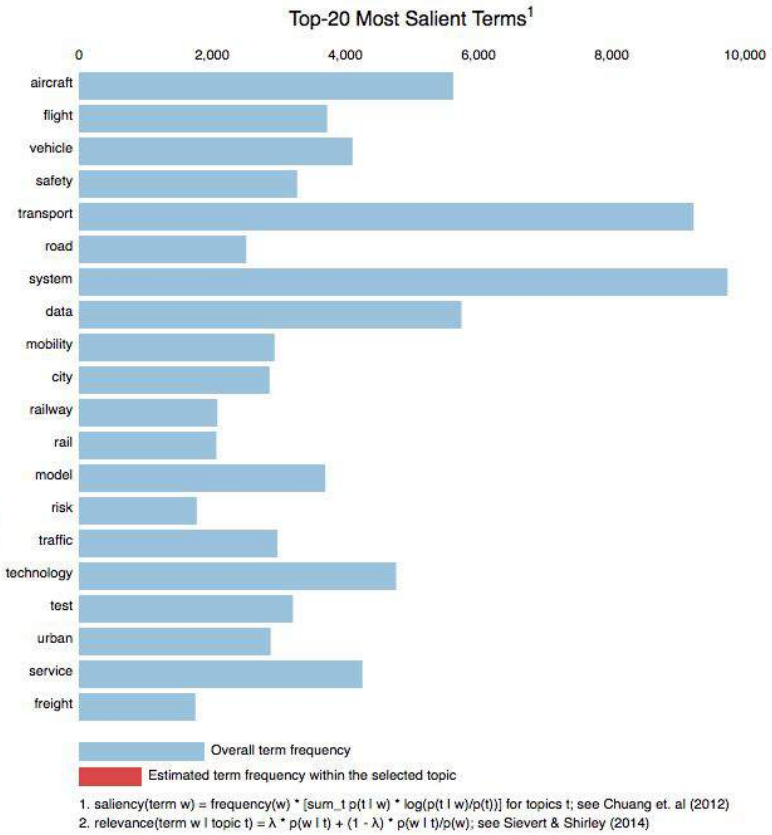
STOP!

Back-up slides

Create a latent space of data

Create a latent space of data





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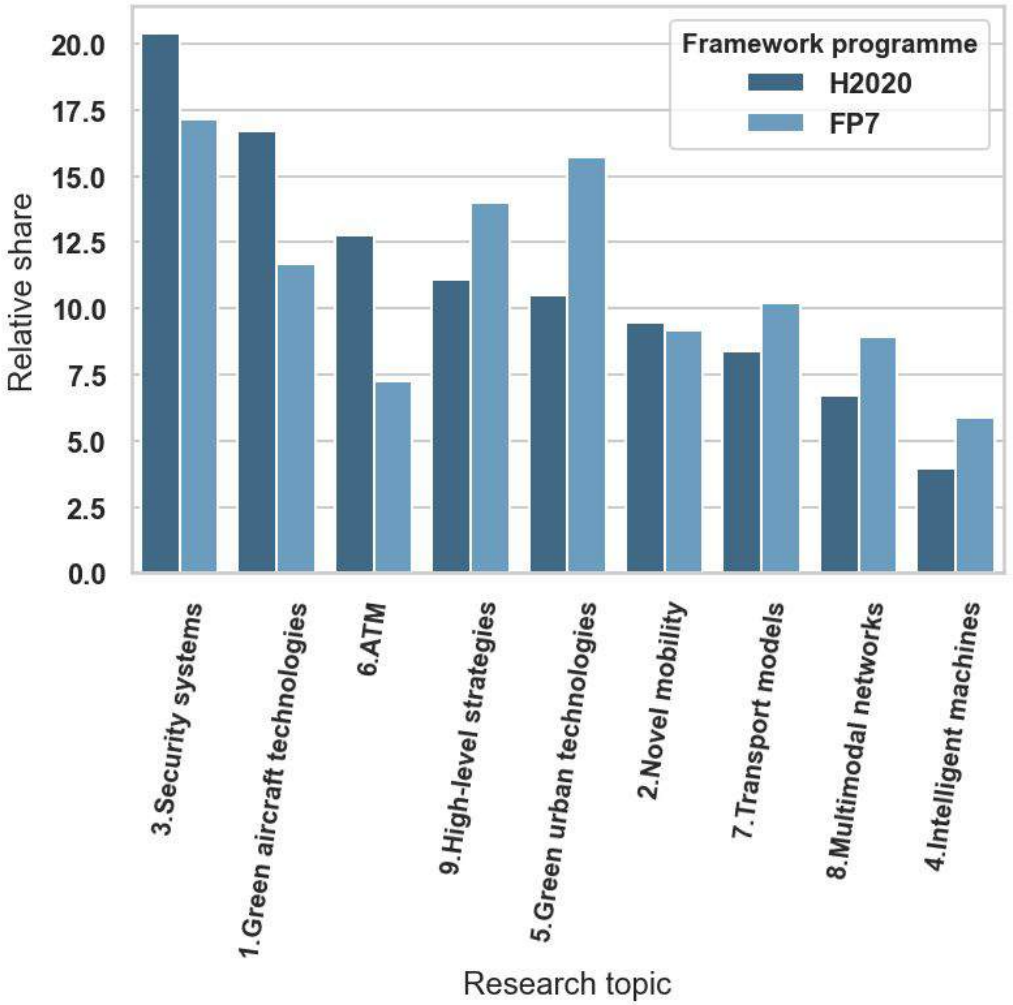

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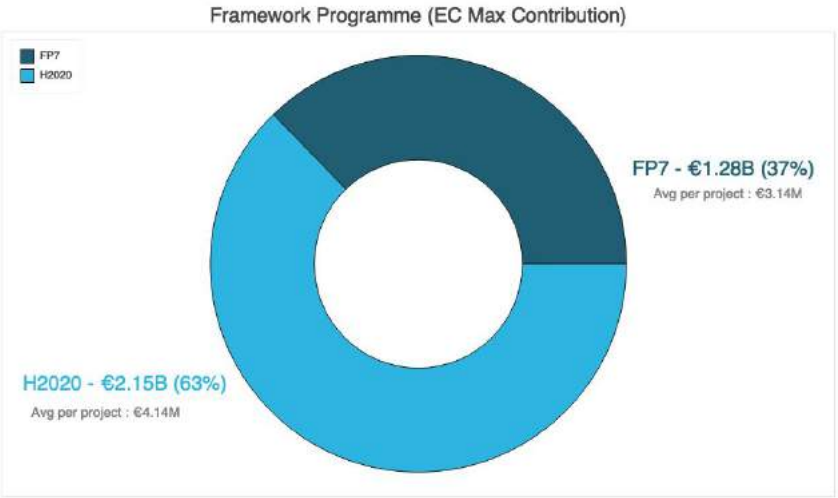
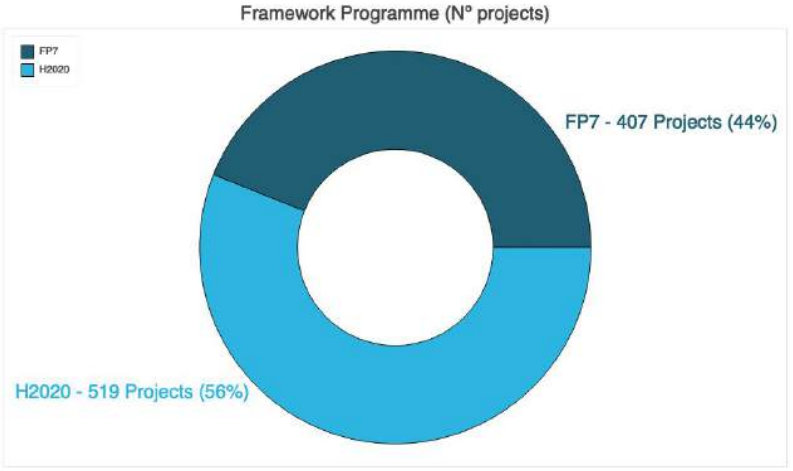
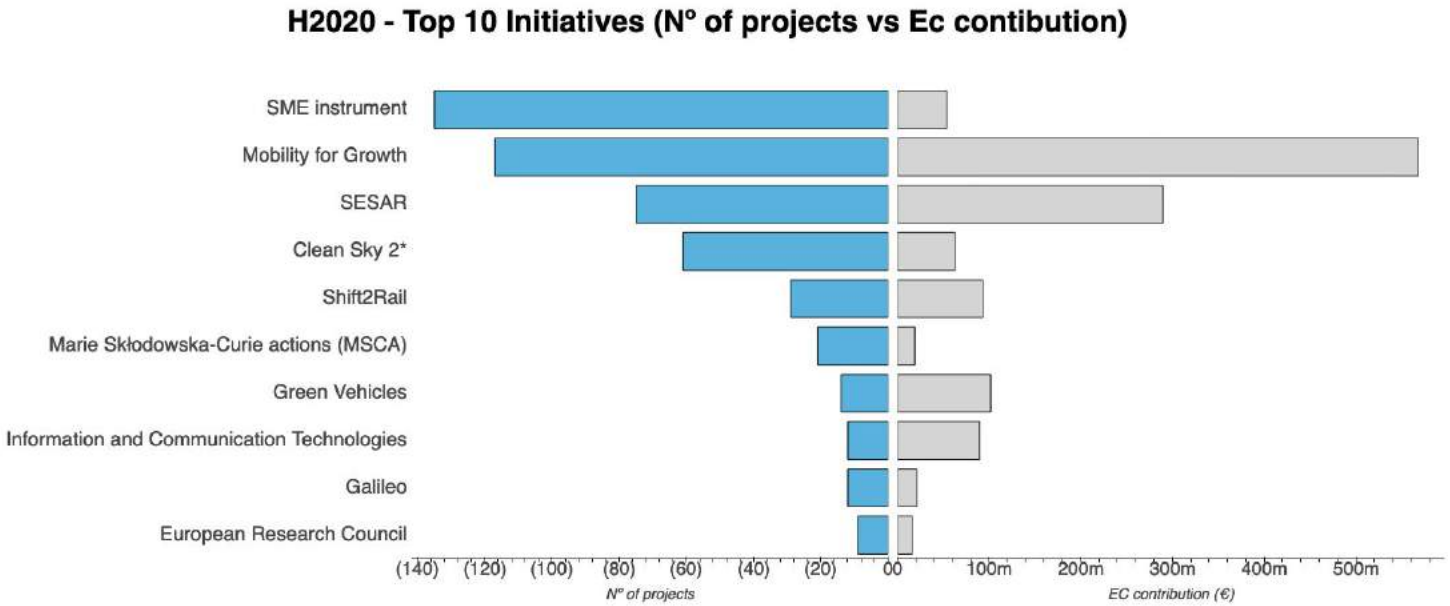
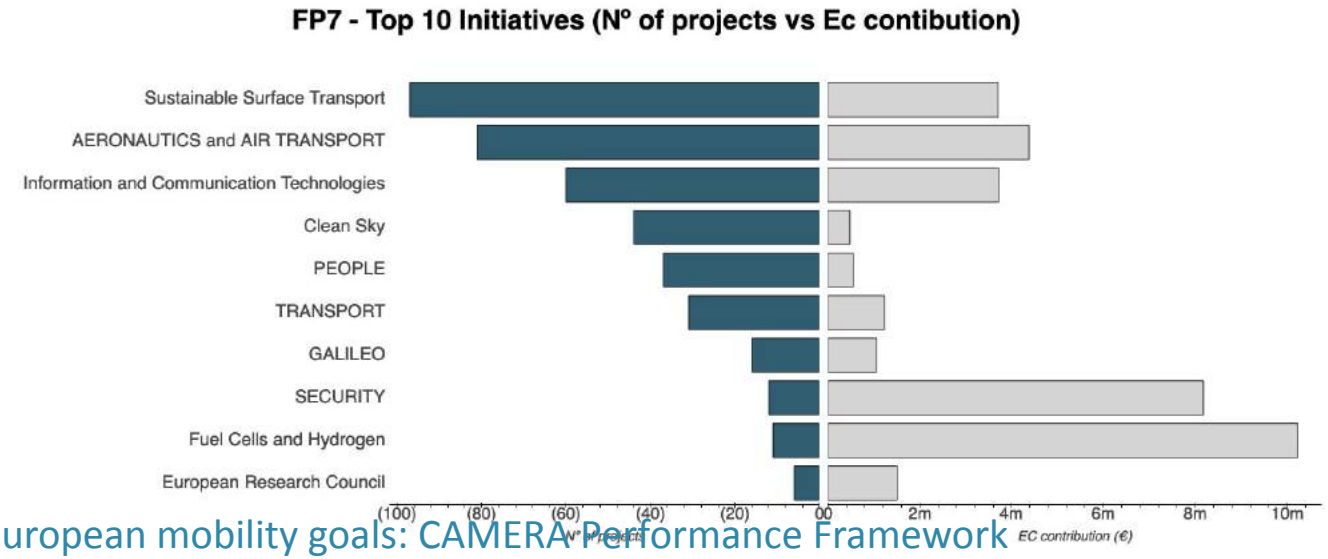




Top mobility initiatives in H2020 and FP7





Trend analysis