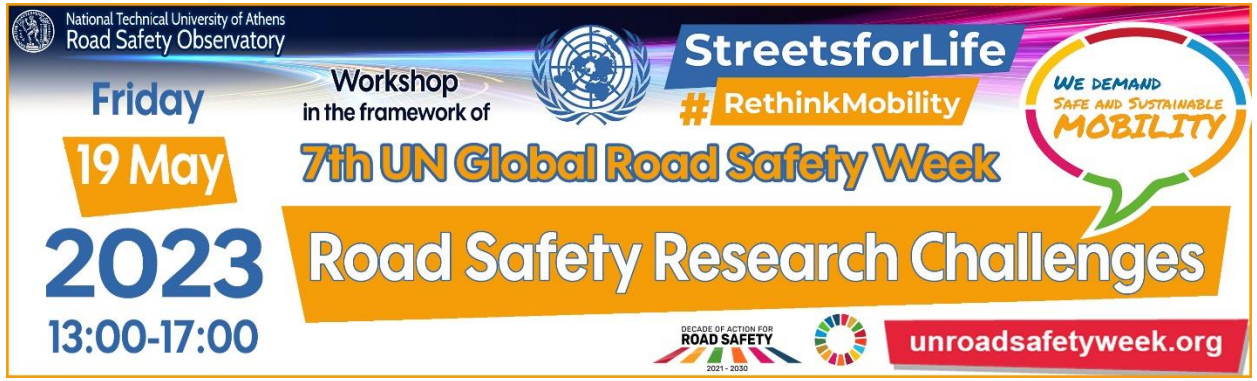

PHOEBE: Predictive Approaches for Safer Urban Environments

Thodoris Garefalakis

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Together with:

Apostolos Ziakopoulos, Maria Oikonomou,
Stella Roussou, George Yannis

The Phoebe project

- 11 Project partners:

  National Technical University of Athens

  International Road Assessment Programme (iRAP), European Institute of Road Assessment (EIRA), AIMSUN simulation software, The Floow, Technische Universität München, Delft University of Technology, Universitat Politècnica de València, OSeven Telematics, Factual consulting, POLIS Network

- Duration of the project:

  45 months (November 2022 – July 2026)

- Framework Program:

This project has received funding from the European Union's Horizon Europe Research and Innovation Programme under grant agreement No 101076963

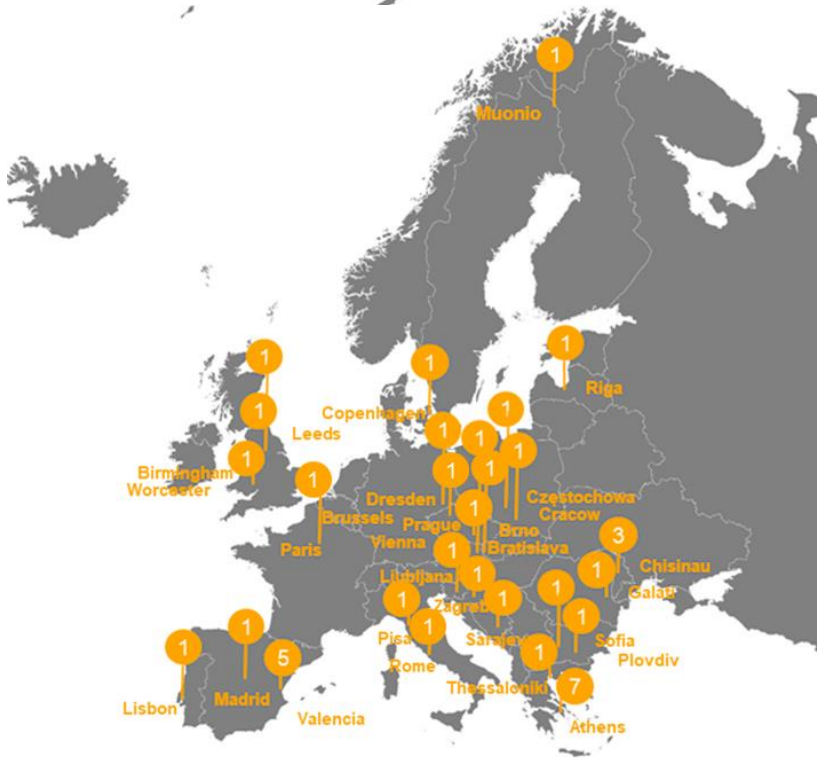
Objectives

PHOEBE aims to increase the road safety of vulnerable road users, especially those who use active mobility and e-scooters, by:

- Exploiting telematics through data analysis techniques that are innovative and efficient.
- Harmonizing safety definitions in traffic simulation models with those used in road safety assessment.
- Developing integrated urban risk assessment models and tools for application of the methodological framework.

Stakeholder survey

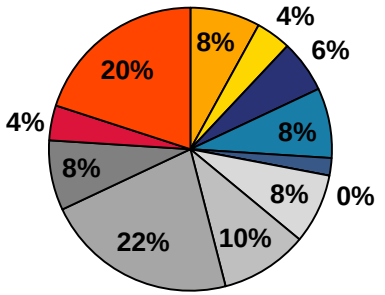
- As initial data collection, a dedicated online survey was designed in order to review the needs and gaps of local-level stakeholders globally.
- From the stakeholder survey a total number of 50 responses was received.
- In terms of city coverage, the distribution of respondents covers 36 cities worldwide
- The majority of them (41 in total) work in Europe covering 29 European cities.



Respondent specifications

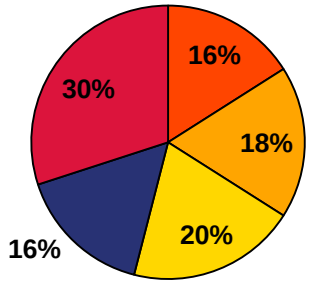
- Most respondents (22%) are private sector employees involved in road safety.
- Most respondents (30%) have more than 20 years of experience in their position.
- Most respondents (17%) use a safety assessment methodology, while 10% of respondents use macroscopic traffic simulation.

Stakeholders main role in cities



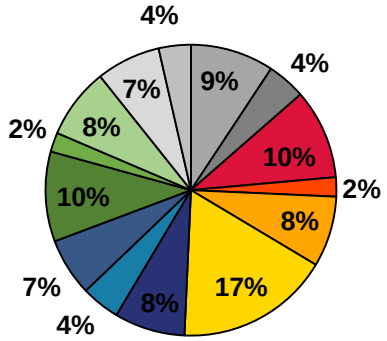
- Road administration
- Road maintenance
- Implementation of infrastructure interventions
- Public transport design/operations
- Mobility service provider
- Traffic police
- Traffic management/optimization
- Other city authority
- Private sector involved in road safety
- Private sector involved in public transport
- Other private sector
- Other

Stakeholders years of experience



- 0-5 years
- 5-10 years
- 10-15 years
- 15-20 years
- >20 years

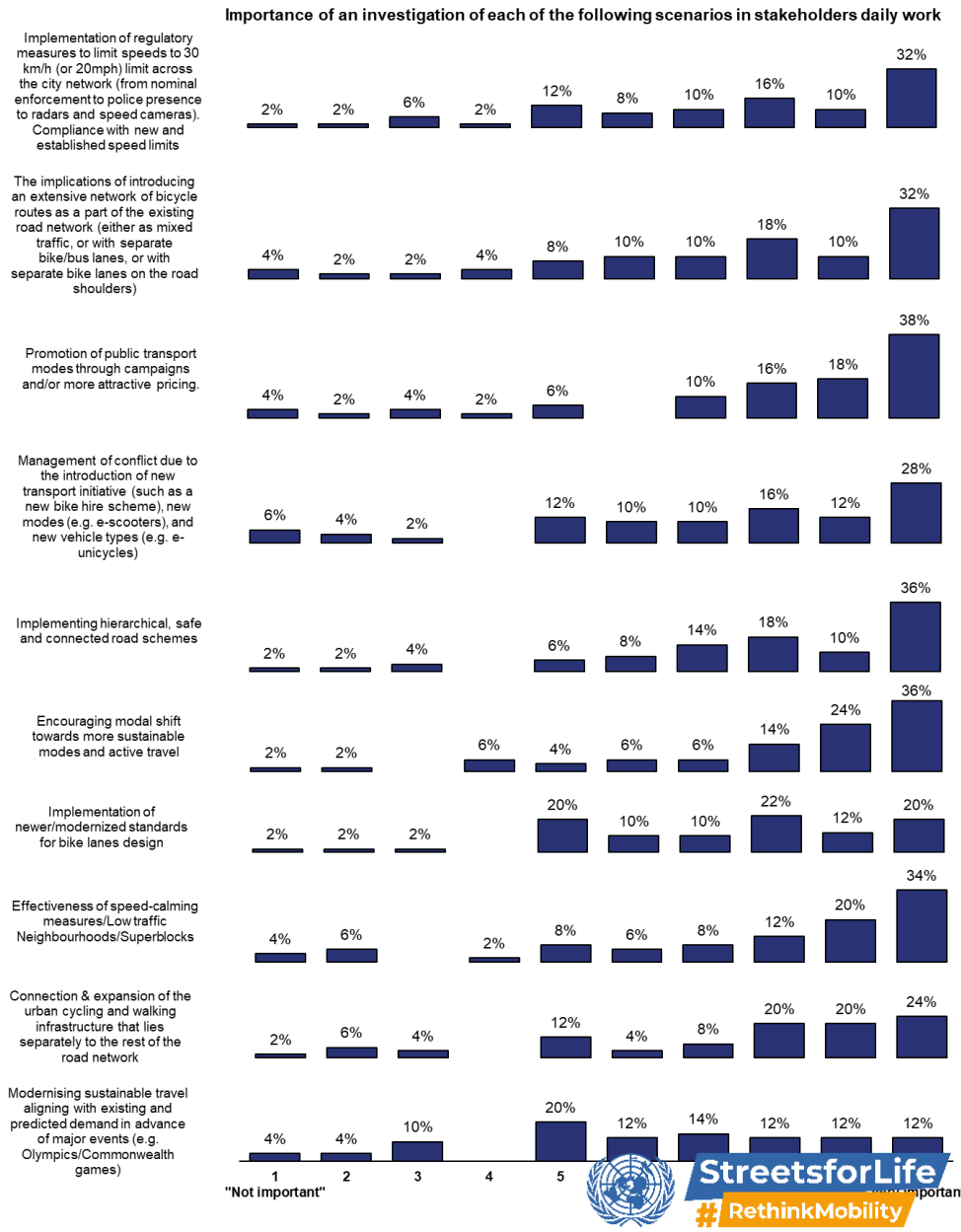
Software/tool types that stakeholders use in daily activities



- Microscopic traffic simulation
- Mesoscopic traffic simulation
- Macroscopic traffic simulation
- Pedestrian microscopic simulation
- Traffic signal optimization software
- Road safety assessment methodology
- Road safety assessment software
- Road safety telematics software
- Video image processing software
- Routing software
- Logistics software
- Public transport scheduling/management software
- Public transport telematics software
- Other

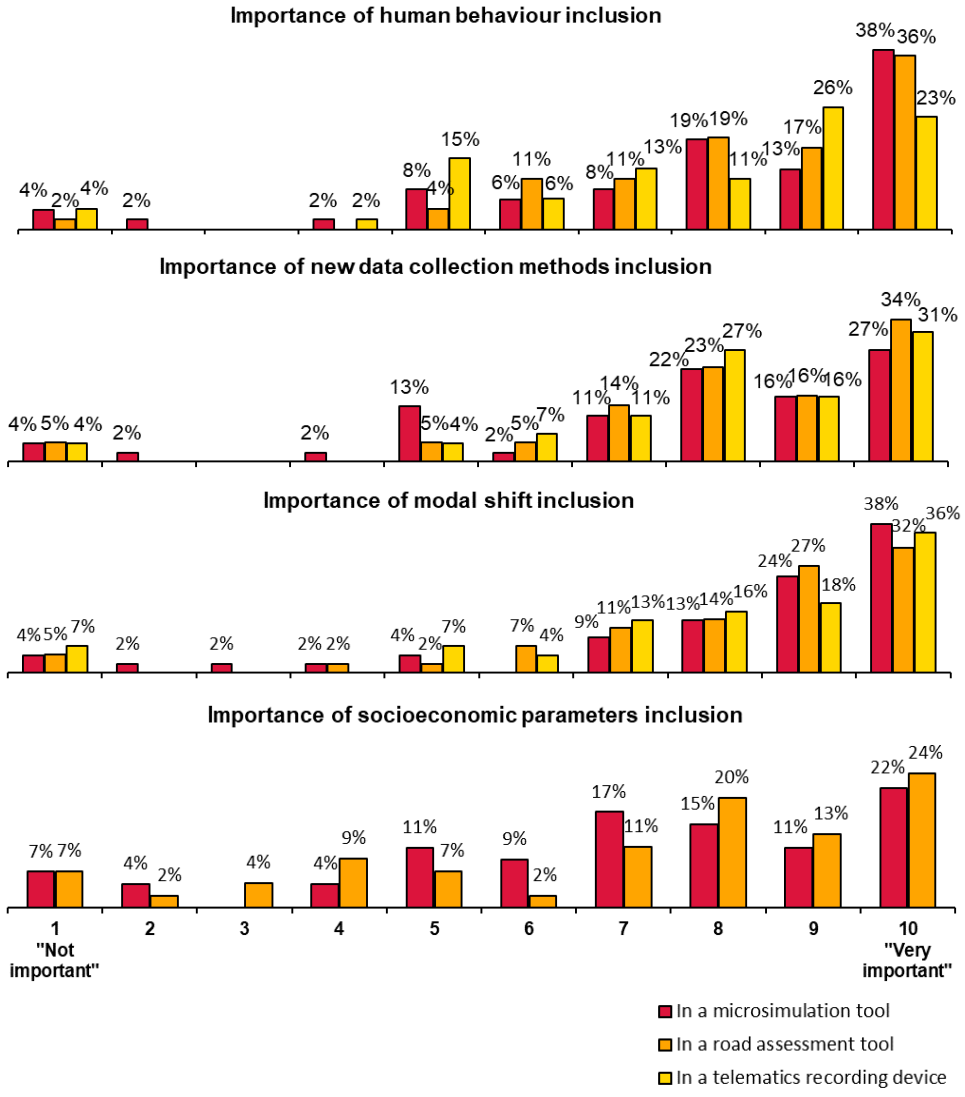
Scenario determination

- It was reported that several scenarios need prioritization:
  - implementation of regulatory measures to limit speeds
  - introducing extensive network of bicycle lanes
  - promotion of public transport modes
  - introduction of new transport modes
  - implementing hierarchical schemes
  - encouraging modal shift
  - speed calming measures
  - expansion of cycling and walking infrastructure
- Lower priority could be given to other scenarios, namely:
  - implementation of newer standards for bike lane design
  - modernizing sustainable travel aligning with existing demand in advance of major events



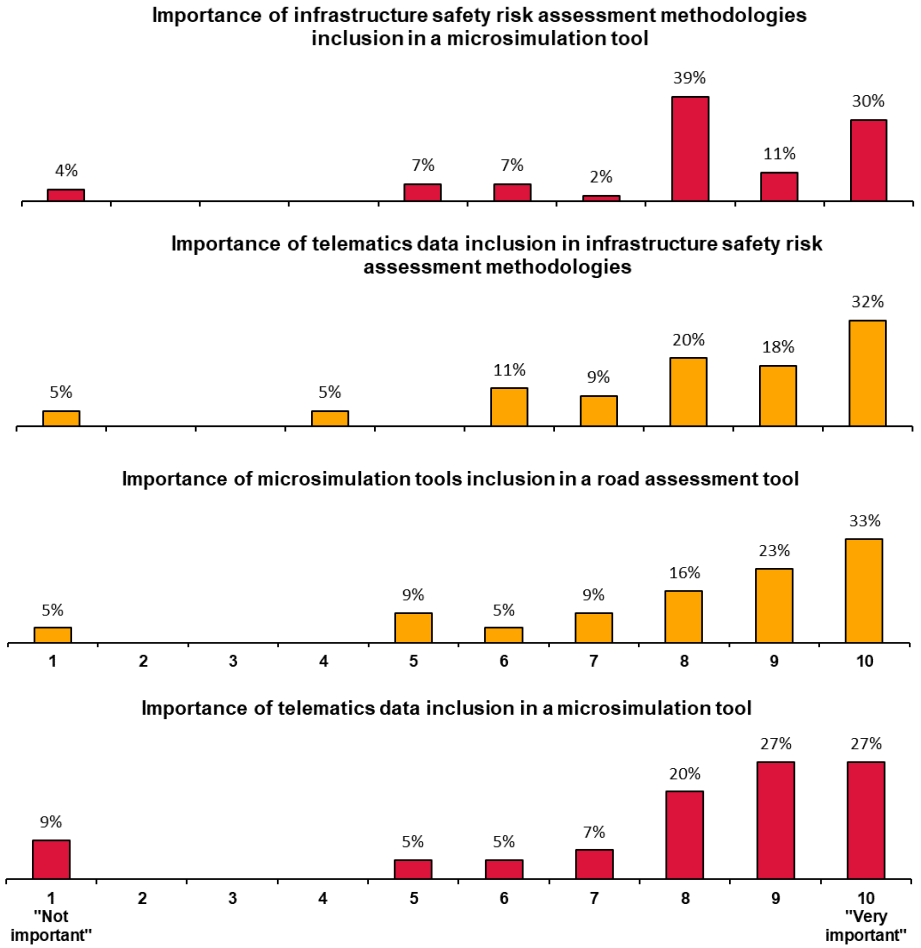
Phoebe Tool requirements (1/2)

- Most respondents stated that the inclusion of human behavior models (38%), data collection methods (27%), modal shift (38%) and socioeconomic parameters (22%) in microsimulation tool is highly important.
- Similarly, most respondents identified that is very important to include in road assessment tool human behavior models (36%), data collection methods (34%), modal shift (32%) and socioeconomic parameters (24%).
- Most respondents stated a high importance of deriving human behaviour patterns from telematics data (23%) and monitoring modal shift effects (36%) using a telematics recording device.



Phoebe Tool requirements (2/2)

- Most respondents (39%) tend to agree that infrastructure safety risk assessment methodologies inclusion in a microsimulation tool is slightly important.
- Similarly, a simultaneous inclusion of telematics and microsimulation data in road safety assessment methodologies is very important (32% and 33% respectively).
- Finally, it seems that most respondents (27%) agreed that is highly important to include telematics data in a microsimulation tool.

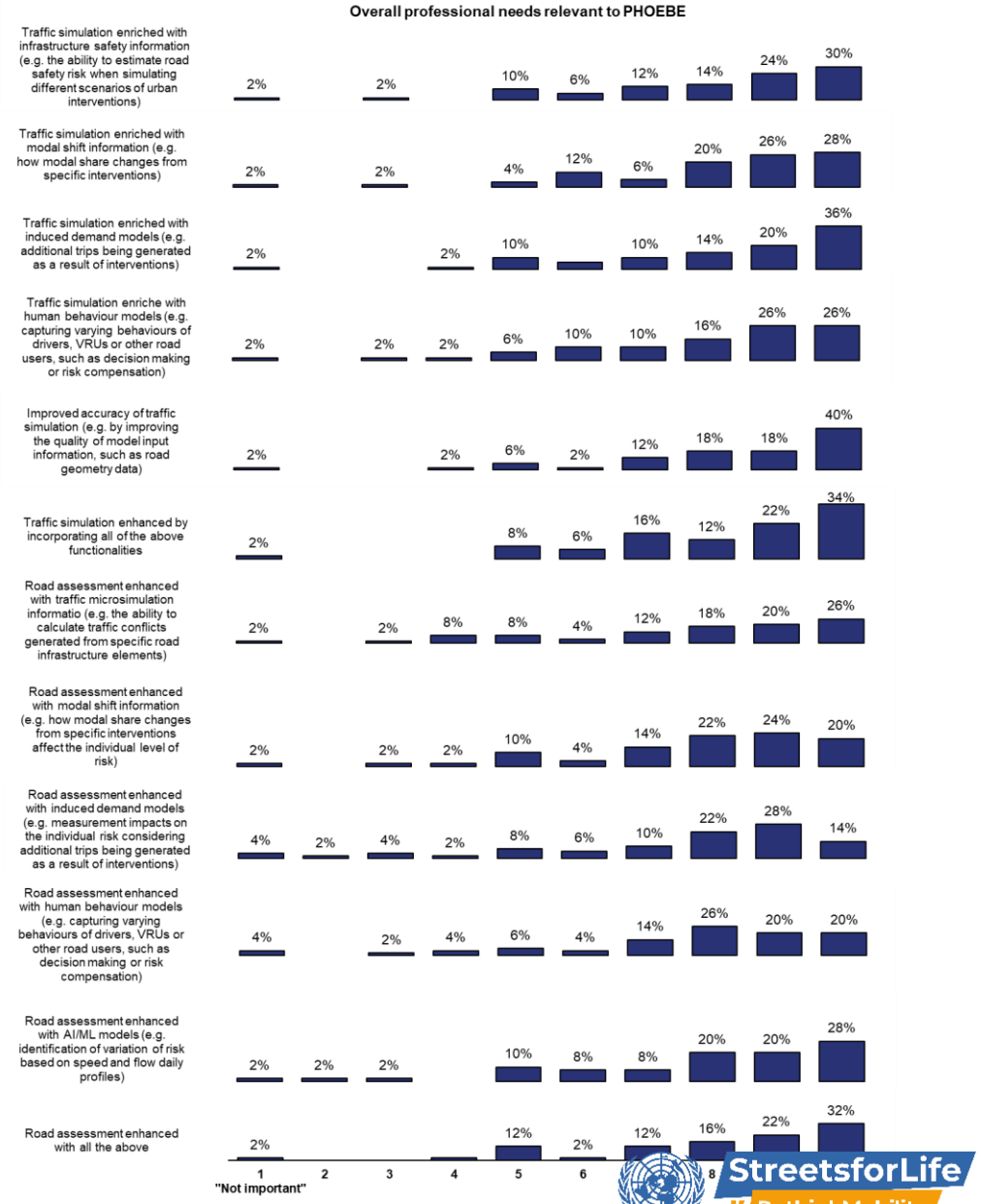


Stakeholder needs

- A high priority was requested to enrich simulation with:
  - safety information
  - modal shift
  - induced demand models and
  - human behaviour models

  as well as to enrich safety assessment with:
  - microsimulation information
  - AI/ML models.

- A lower priority was requested to enhance road assessment with:
  - modal shift information
  - induced demand models
  - human behaviour models.



Streets for Life

- Overall, PHOEBE will simultaneously improve three main pillars of modern road safety tools (telematics, simulation and risk assessment models) with emphasis on vulnerable road users.

- Survey results and constant stakeholder engagement will ensure that the project outcomes are applicable and relevant to real-world scenarios, making the interventions and framework more effective and impactful.

- PHOEBE will assess safety impacts at the transport system level without the need for detailed simulation of the entire network by applying a simple Select - Simulate - Evaluate - Extrapolate approach

Scientific and social impact

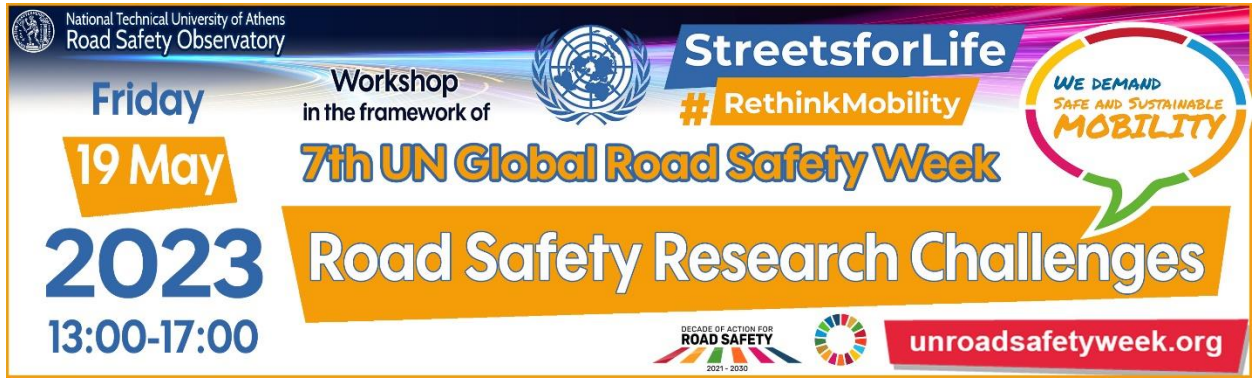
- Results provided valuable evidence in order to determine the scenarios that are worth investigating and therefore the interventions that will be developed.

- A high importance of integrating human behaviors, modal shift, socioeconomic parameters, simulation, safety assessment and data collection methods into the utilized tools was determined.

- The three project use cases (Athens, Valencia, West Midlands) will serve as testbeds to demonstrate the framework applicability and integration with urban transport systems under real conditions

Future challenges

- Creation of self-feeding loops calibrating modal shift based on the evaluations and interventions of the project and beyond Phoebe
- Articulating the integration of the components of the risk assessment framework in a more generic and transferable manner
- Seamless transitioning from microscopic to macroscopic simulation scales
- Investigation of the framework applicability in rural/interurban locations
- Envelopment, integration and utilization of more data sources (e.g. weather, PT, vehicle ridership etc.)



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