



Academic Network
Research in Mobility Committee
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Mobility and Safety Research Challenges in Public Transport

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Department of Transportation Planning and Engineering & NTUA Road Safety Observatory



Department of Transportation Planning and Engineering NTUA

- The mission of the NTUA DTPE (www.transport.ntua.gr) is to **educate scientists engineers and promote science** in the field of transportation planning and engineering.
- The NTUA DTPE is a **Center of Research and Innovation Excellence** with global recognition [Ranked 9th in Europe, 39th worldwide (Shanghai Ranking's 2017), Scientific citations: 3rd in Europe, 19th worldwide (Pulse 2017), Road Safety: 2nd in Europe, 6th worldwide (AAP, 2018)].
- A **Team of 60+ Scientists**: 7 Internationally recognized Professors, 15 Senior Transportation Engineers and PostDoc, 30 PhD Candidates, 15 Transportation Engineers and other scientists.
- **NTUA DTPE Activities in figures** (since mid 80s):
 - More than 1.100 Diploma and 30 **PhD Theses**,
 - More than 330 research **projects**, mostly through highly competitive procedures,
 - More than 1.100 scientific **publications** (> 400 in Journals), widely cited worldwide,
 - More than 150 scientific **committees**,
 - International **collaborations**: EC, UN/ECE, OECD/ITF, WHO, World Bank, EIB, CEDR, FEHRL, ERF, IRF, UITP, ETSC, WCTR, TRB, Universities and Research Centers.



NTUA Road Safety Observatory

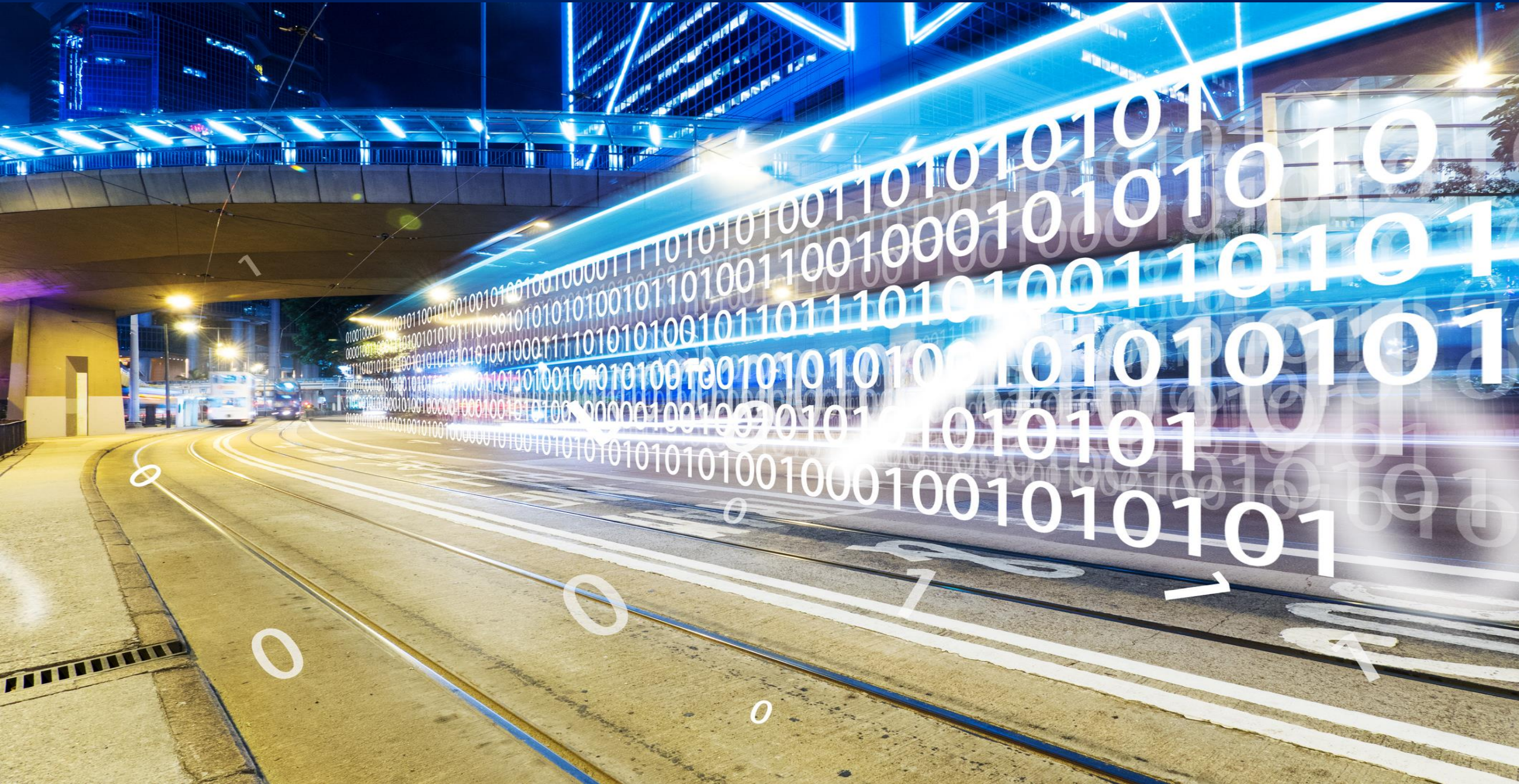
- The NTUA Road Safety Observatory (www.nrso.ntua.gr) is a **Center of Research and Innovation Excellence on Road Safety**, with global recognition [ranked: 2nd in Europe and 6th worldwide (AAP 2018)]
- A **Team of 25+ Scientists**: internationally recognized Professors, Senior Transportation Engineers, PostDoc, PhD Candidates and other scientists
- An **international reference website** - information system with state-of-the-art road safety data and knowledge:
 - more than 3.000 visits per month
 - 110+ electronic newsletters since 2007
 - tens of tweets and social media posts annually
 - network of more than 4.000+ road safety experts in Greece (1000+) and worldwide (3.000+)
- An excellent **research activity**:
 - More than 100 Diploma Theses & 6 **PhD Theses**,
 - More than 100 road safety research **projects**, mostly highly competitive,
 - More than 500 road safety **publications** (> 200 in scientific Journals),
 - More than 100 scientific **committees**,
 - International **collaborations** : European Commission, UN/ECE, OECD/ITF, WHO, World Bank, EIB, CEDR, FEHRL, ERF, IRF, UITP, ETSC, WCTR, TRB, decades of Universities and Research Centers.



George Yannis, UITP Research in Mobility Committee – April 2021



Public Transport and Mobility Activities



Public Transport and Mobility activities

NRSO is **actively engaging** in several PT and mobility related activities:

- **Traffic management schemes** for the promotion of Public Transport & Sustainable Mobility
- **Traffic simulation** of urban road networks, including public transport modes
- **Mobility characteristics** of Traffic Safety with emphasis on vulnerable road users
- **Impact Analyses** of electromobility, connected and shared mobility
- **Impact of Traffic Automation** on public transport operations



Athens Great Walk

Reforming public space for the promotion of **public transport** and **active travel modes**

- Objective: **safe green and efficient transport for all**
- Harmonized with the **Sustainable Urban Mobility Plan** of Athens and the related trends in European cities
- **Promoting public transport, walking and cycling** through new bus, pedestrian and cycle lanes as well as mixed traffic with low speeds
- **Wider and safer sidewalks** in central axes to increase accessibility
- Streets / areas **free of private vehicles**



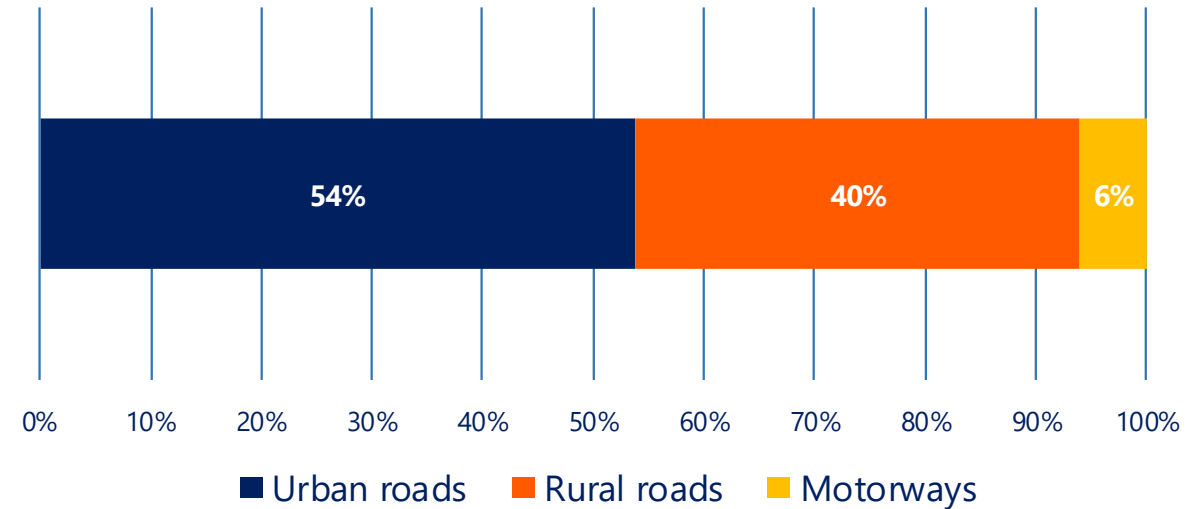
Public Transport and Road Safety



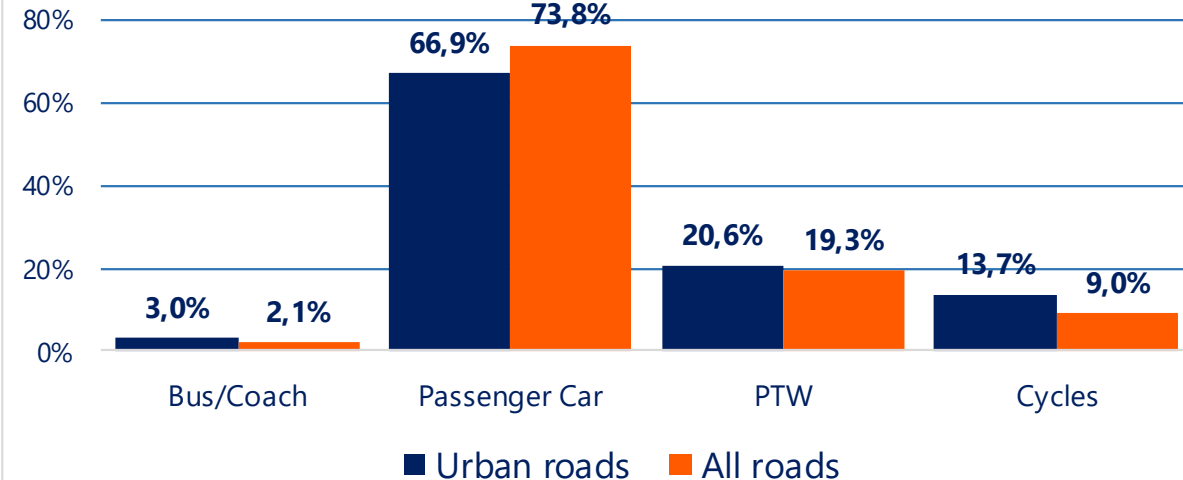
Public Transport fatalities in the EU

- In 2019, **484 fatalities in accidents involving bus or coach** were recorded in the EU
- Most fatalities in accidents involving a bus/coach occur **inside urban areas** (54%)
- Road fatalities involving buses represent only a **3% of total urban road fatalities**, being by far the safest road transport mode (active and passive safety).

Fatalities in accidents involving a bus/coach

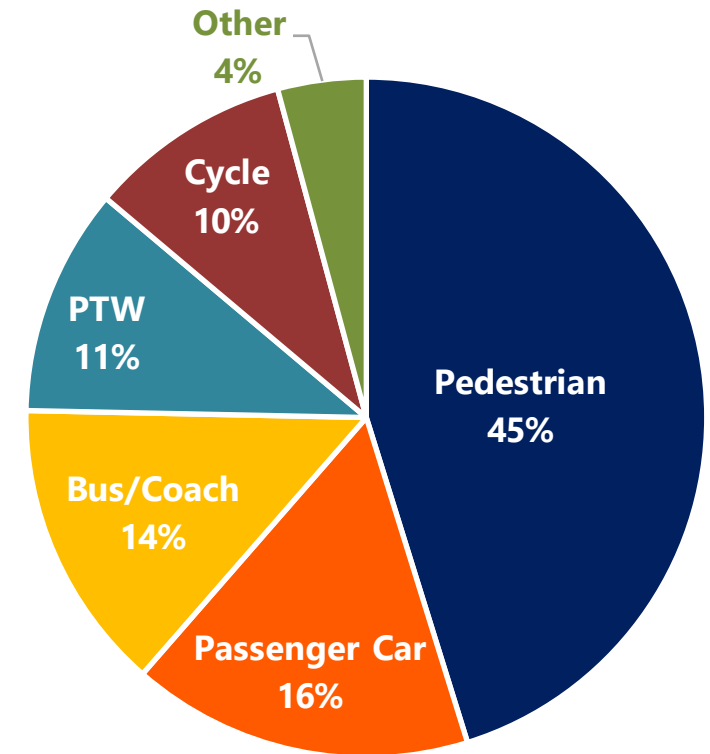


Fatalities in accidents involving each transport mode per total fatalities



Transport modes involved in Public Transport accidents

- In bus or coach accidents, **14%** of fatalities are the **occupants of the bus or coach**
- A **high proportion of vulnerable road users** (pedestrians, cycles, PTWs) is recorded among the fatalities in accidents involving a bus or coach
- In 2019, **pedestrians accounted for 45%** of fatalities in bus or coach accidents in urban areas



Fatalities in accidents involving a bus/coach per transport mode in urban areas, EU, 2019

Cross-city analysis in Europe

- A cross-city analysis was performed to estimate the **relationship between the mobility characteristics and the number of road fatalities** in Europe
- Various **mobility indicators** related to modal split, distribution of vehicle fleet by type of vehicle and road network characteristics were examined
- Mobility data for **25 European cities** were collected from the UITP Mobility in Cities Database and accident data from the EU CARE database
- **Generalized Linear Models** were developed for all road accident fatalities and for fatalities in different types of accidents



Modelling all fatalities

Variables examined

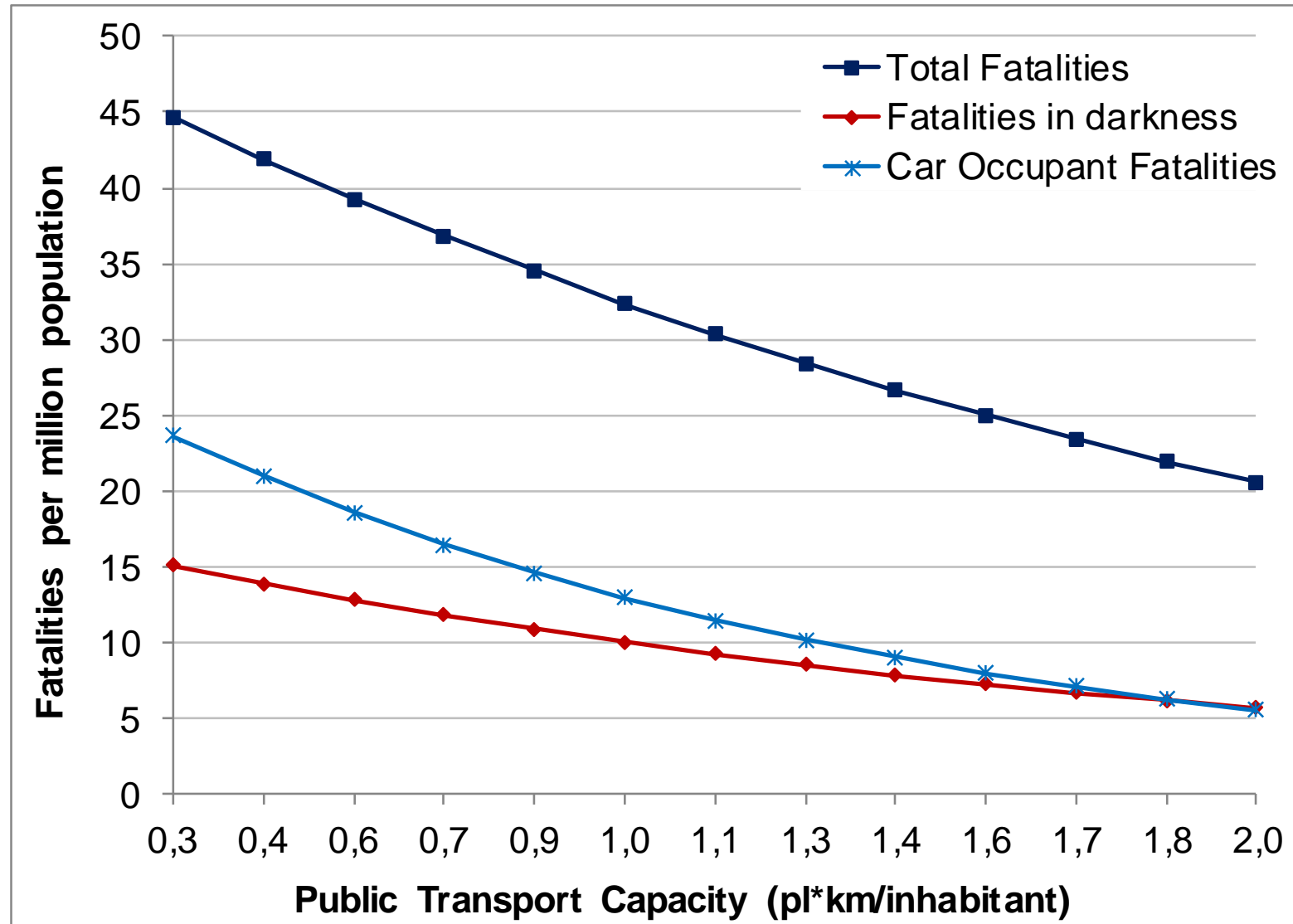
- Gross Domestic Product (GDP) per inhabitant (euro)
- Urban population density (persons/ha)
- Length of roads per urban hectare (meters/hectare)
- Motorcycles per population (motorcycles/thousand inhabitants)
- **Public Transport Capacity offered** (place*kilometres/inhabitant)
- Percentage of daily trips by bicycle

Indicator	Estimate	Wald Chi-square	Sig.	e _i	e _i *
Intercept	11,041	9,265	0,002		
LN (GDPcap)	-0,526	3,523	0,061	-1,893	22,386 ⁻
LN (Population density)	-0,402	2,507	0,113	-0,351	-4,149
Road Network Density	-0,007	7,774	0,005	-0,351	-4,149
Motorcycles/pop.	0,019	28,145	0,000	0,293	3,469
PT Capacity	-0,462	2,523	0,112	-0,170	-2,009
% Trips by Bicycle	-0,067	3,872	0,049	-0,085	-1,000
(Scale) ^a	0,213				
Omnibus Test					
Likelihood Ratio Chi-square	23,913		0,01		
Degrees of freedom	6				
Goodness of Fit					
Log Likelihood	-16,161				

Dependent Variable: LN(F/P)

Public Transport effects

- Increase in the **offered public transport capacity** leads to decrease in road fatalities per population.
- **Car occupant fatalities** and fatalities in **darkness** present higher rates of decrease compared to the total number of fatalities.



Key Conclusions

- Buses or coaches are by far the **safest modes of road transport inside urban areas**, recording significantly fewer fatal accidents.
- The **offered public transport capacity** plays a significant role in the improvement of road safety of a city
- Increase in the offered public transport capacity by a city leads to **greater use of public transport** and therefore, to a lower likelihood of being involved in a road accident
- Thus, in order to improve city safety, there is a need not only to create a safer road environment, but also to provide incentives to the citizens for the **use of alternative means of transport**



Key Challenges

Key Challenges

- Imbalance between **urban mobility and safety policies**
- **Speed** being a conflicting choice between mobility and safety
- It is impossible to be fast and safe, unless we use **efficient Public Transport**
- Mobility and safety policies **can both benefit greatly** from the promotion of public transport and active travelling
- Public transport being **up to ten times safer** than passenger car traffic
- **Broader alliances** are required, UITP being a frontrunner





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