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Ευρωπαϊκό Ταμείο Περιφερειακής Ανάπτυξης
ΕΥΡΩΠΑΪΚΗ ΕΝΩΣΗ
step2smart

Διασυνοριακή Συνεργασία Νησιώτικων Αστικών Περιοχών για Βελτίωση των Περιβαλλοντικών Συνθηκών μέσω Χρήσης Συστημάτων Ευφυών Μεταφορών

Συγχρηματοδοτείται από την Ευρωπαϊκή Ένωση (Ε.Τ.Π.Α.) και από Εθνικούς πόρους της Ελλάδας και της Κύπρου

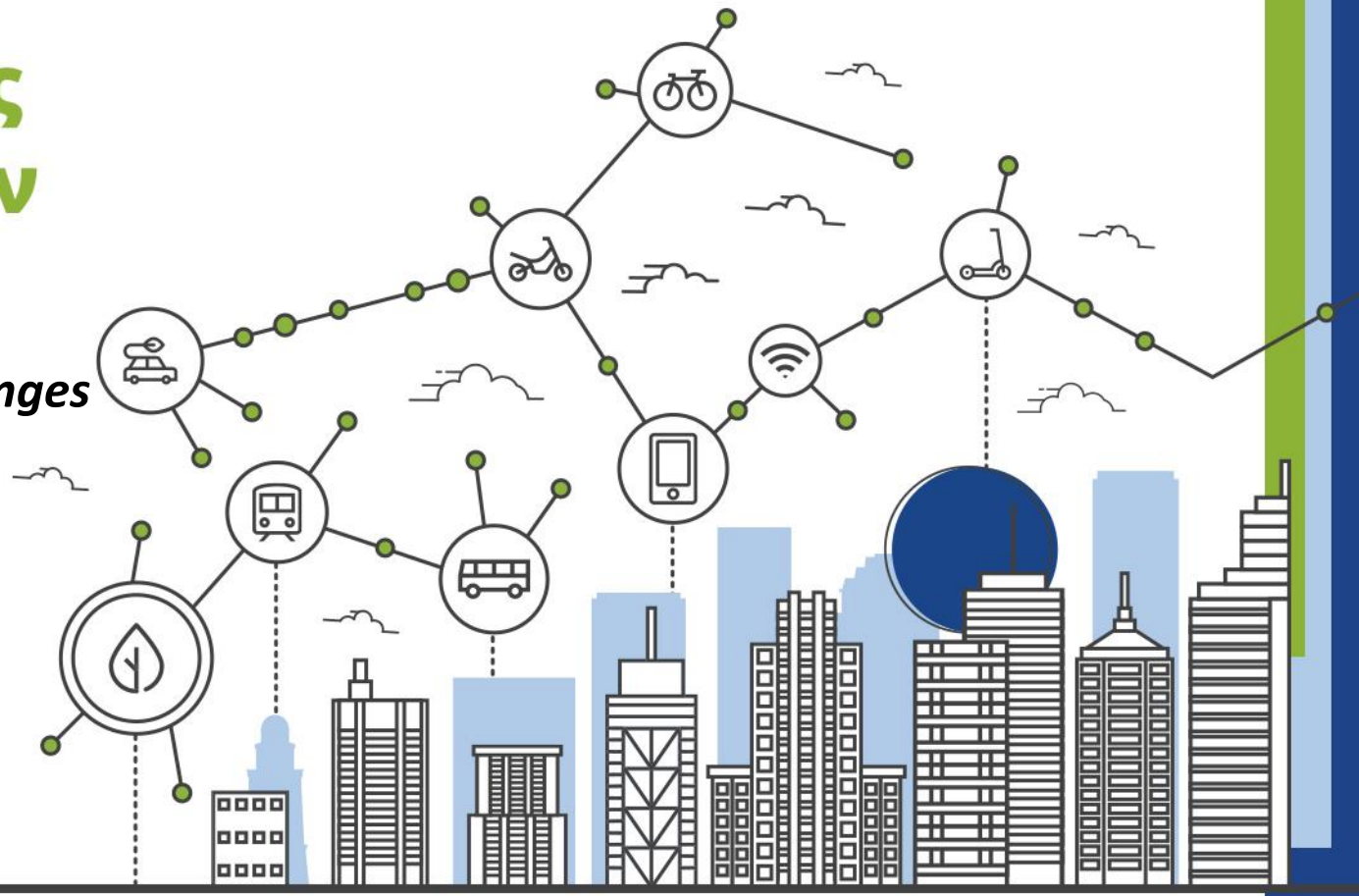
https://greece-cyprus.eu/step2smart

7ο Συνέδριο
Βιώσιμης Κινητικότητας και Ευφυών Συστημάτων Μεταφορών

Multimodality and Micro-mobility in Cyprus: Challenges

Christos Gkartzonikas, Filippos Alogdianakis, Paraskevas Nikolaou, Loukas Dimitriou

Lab for Transport Engineering – University of Cyprus



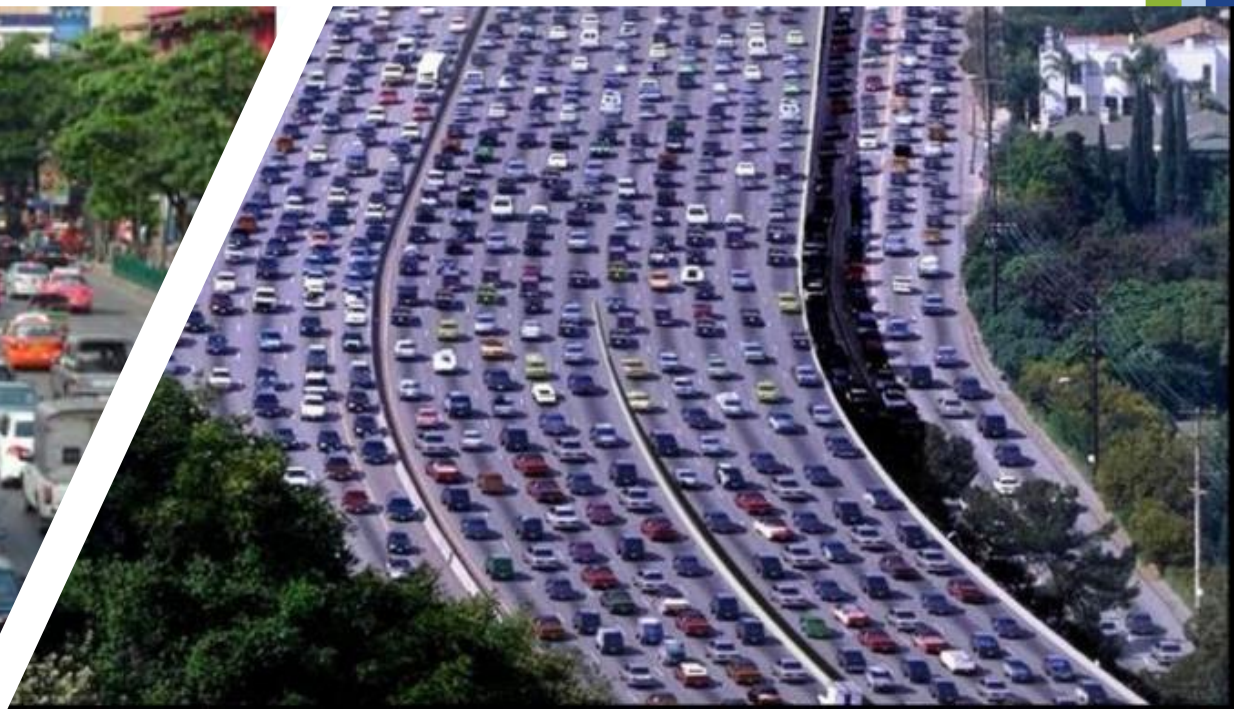
ΚΥΠΡΙΑΚΗ ΔΗΜΟΚΡΑΤΙΑ
ΥΠΟΥΡΓΕΙΟ ΜΕΤΑΦΟΡΩΝ, ΕΠΙΚΟΙΝΩΝΙΩΝ ΚΑΙ ΕΡΓΩΝ

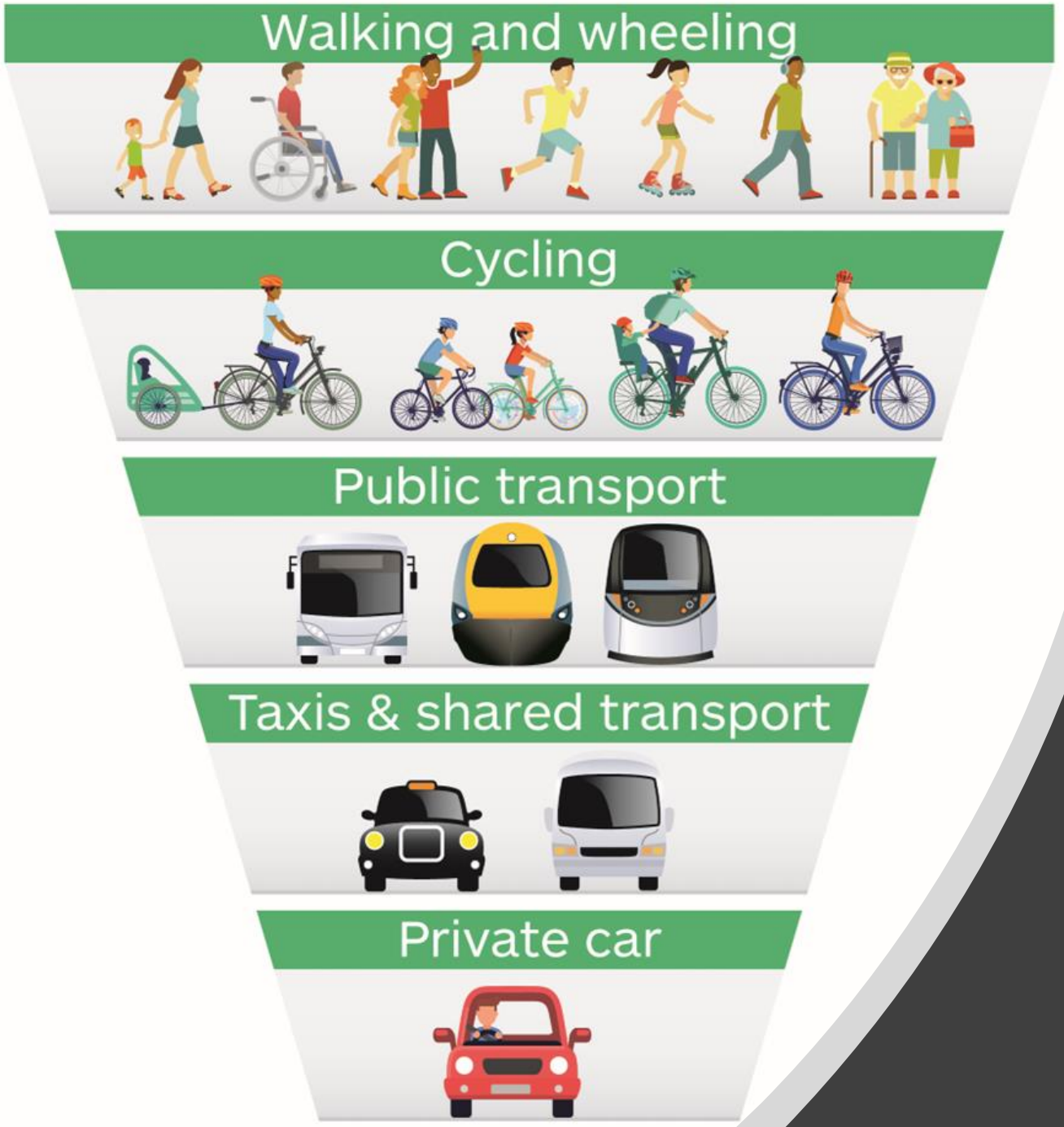
ΤΜΗΜΑ ΔΗΜΟΣΙΩΝ ΕΡΓΩΝ

ΚΑΛΘΟΣ ΒΙΩΣΙΜΗΣ ΚΙΝΗΤΙΚΟΤΗΤΑΣ



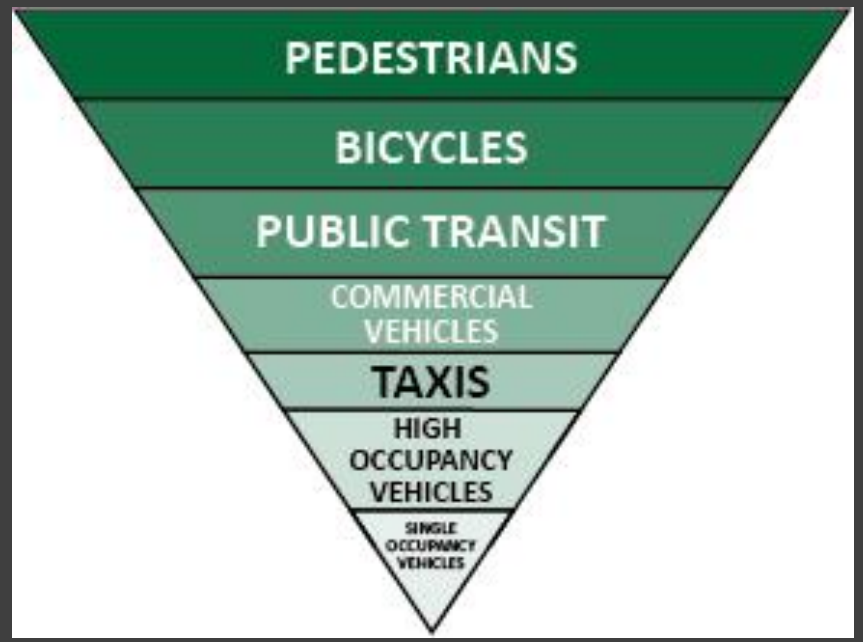




Multimodality

Green Transportation Hierarchy



The concept of Multimodality

- Most communities have **well developed road systems** that allow people to drive to most destinations with relative convenience and safety (at worst delayed by peak period congestion, pay tolls and parking fees at some destinations)
- To be **efficient** and **fair** a transportation system must **serve diverse demands**
- Inadequate mobility options **should not force** urban commuters to drive although they would **prefer** to rideshare or use transit
- Physically, **economically** and **socially disadvantaged people** in particular need diverse mobility options:
  - walking and cycling for local travel
  - public transportation for longer trips
  - vehicles (private vehicles, ride hailing, carsharing) when necessary

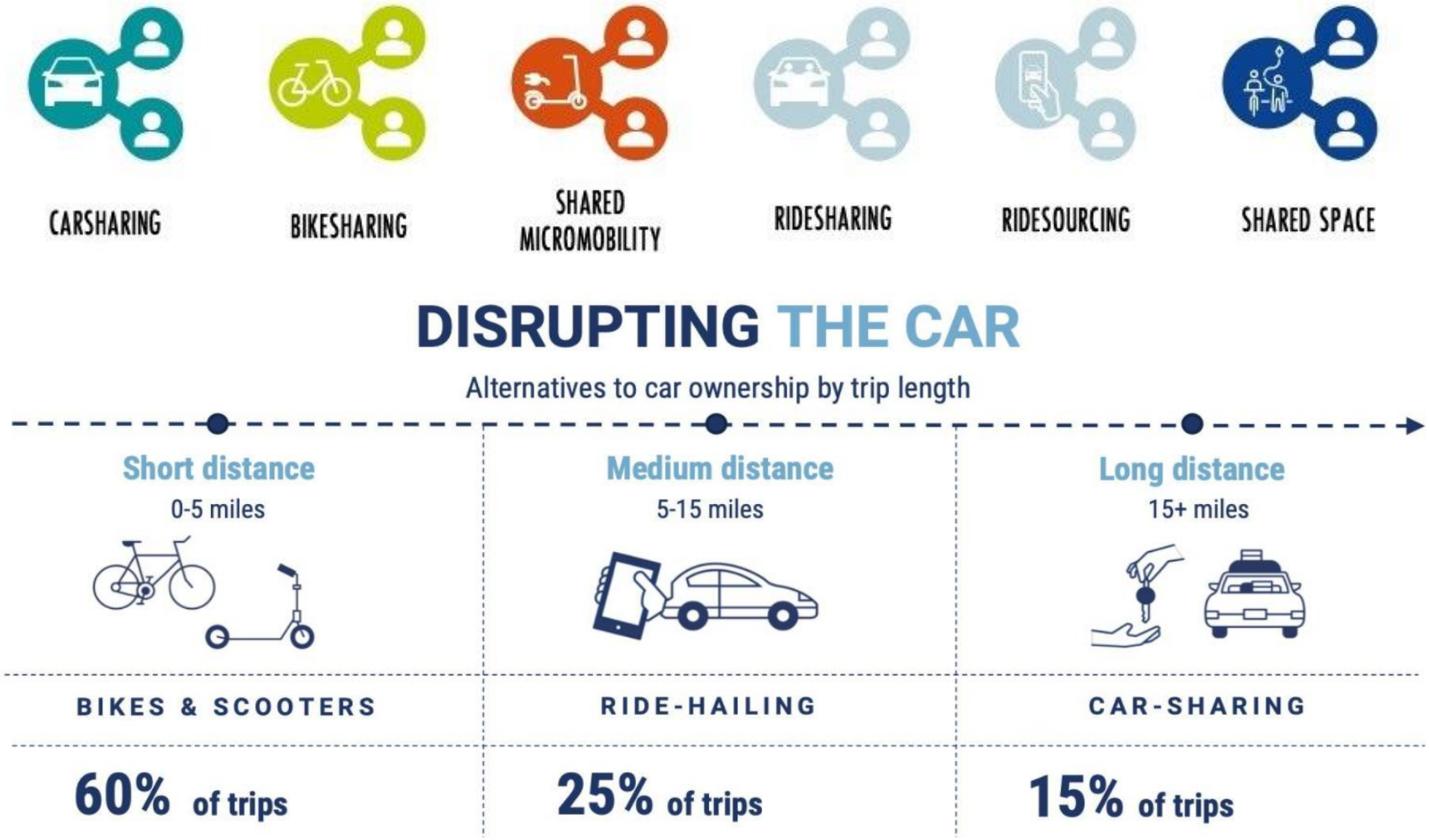
Why not Drive?

Often people need or prefer traveling by alternative transportation modes

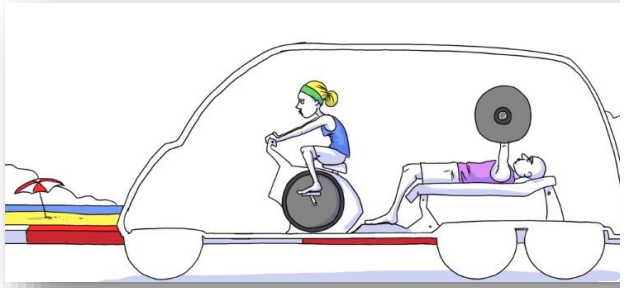
- Many people **cannot drive**. In a typical community, 20-40% of the total population, and 10-20% of adults, cannot drive *(e.g., due to disability, economic, age constraints, or vehicle failures)*.
- Many people **should not drive** for some trips, due to inebriation, disability, or economic constrains *(reduce driving by higher-risk groups, high costs of private vehicles places a major financial burden on many lower-income people)*
- Travelers sometimes **prefer** using alternative modes *(e.g., walking and cycling are more enjoyable and provide healthy exercise, or public transportation imposes less stress and allows commuters to read, work or rest)*.
- **Society could benefit** from more efficient road, parking, fuel and insurance pricing, or more efficient management of road space that favor higher value trips and more efficient modes in order to reduce traffic congestion, parking costs, accidents and pollution emissions

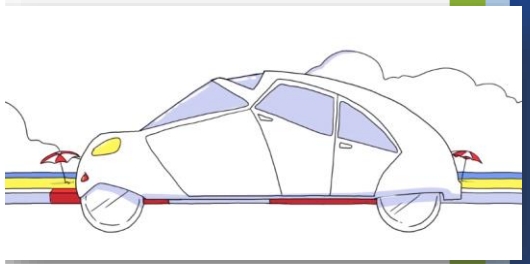
*Interesting fact: Walking, cycling and public transportation tend to be much higher, and private vehicle trips are lower, in **societies with better transport options**. What about our community?

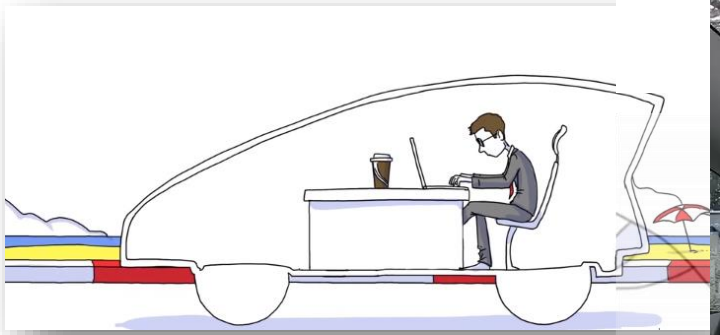
Multimodality – Shared services

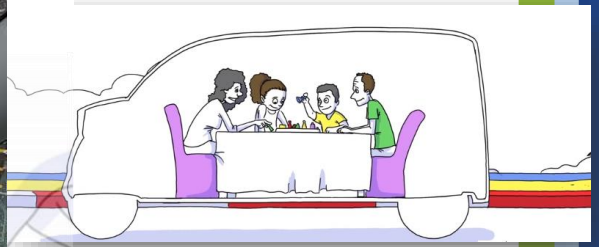


Multimodality – AVs









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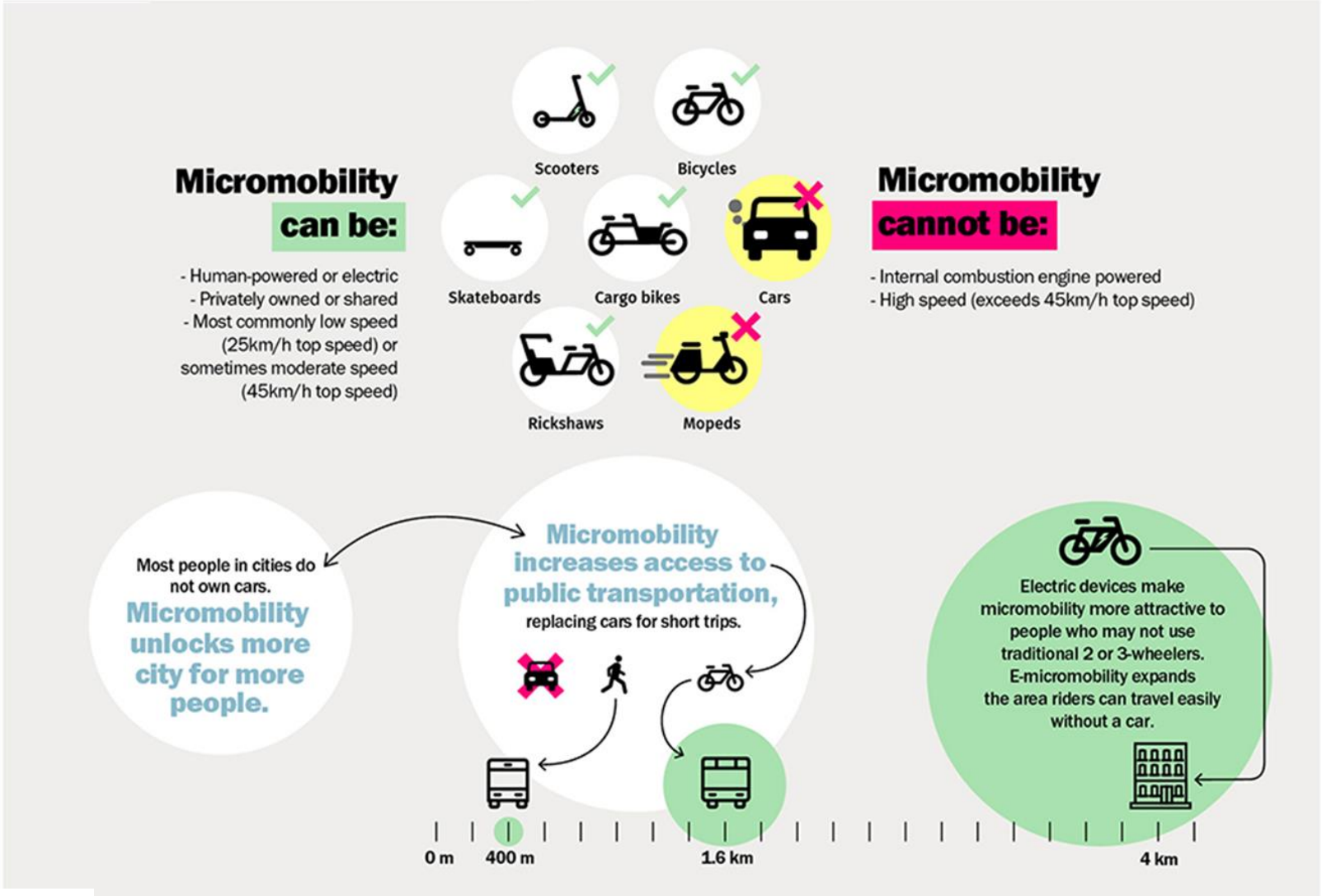
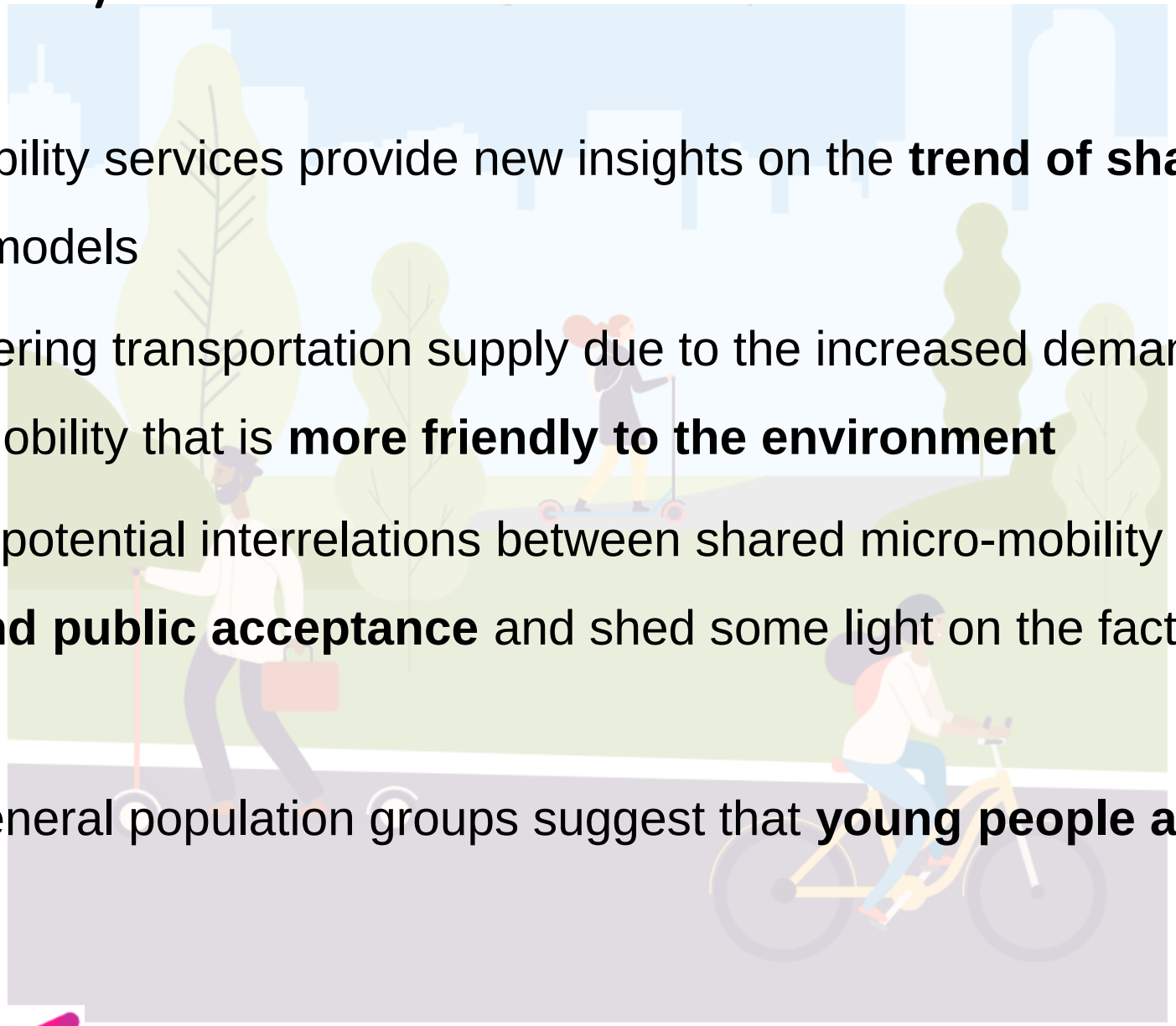
Micro-mobility

Micromobility refers to a range of small, lightweight devices operating at speeds typically below 25 km/h (15 mph) and is ideal for trips up to 10 km.



Micro-mobility

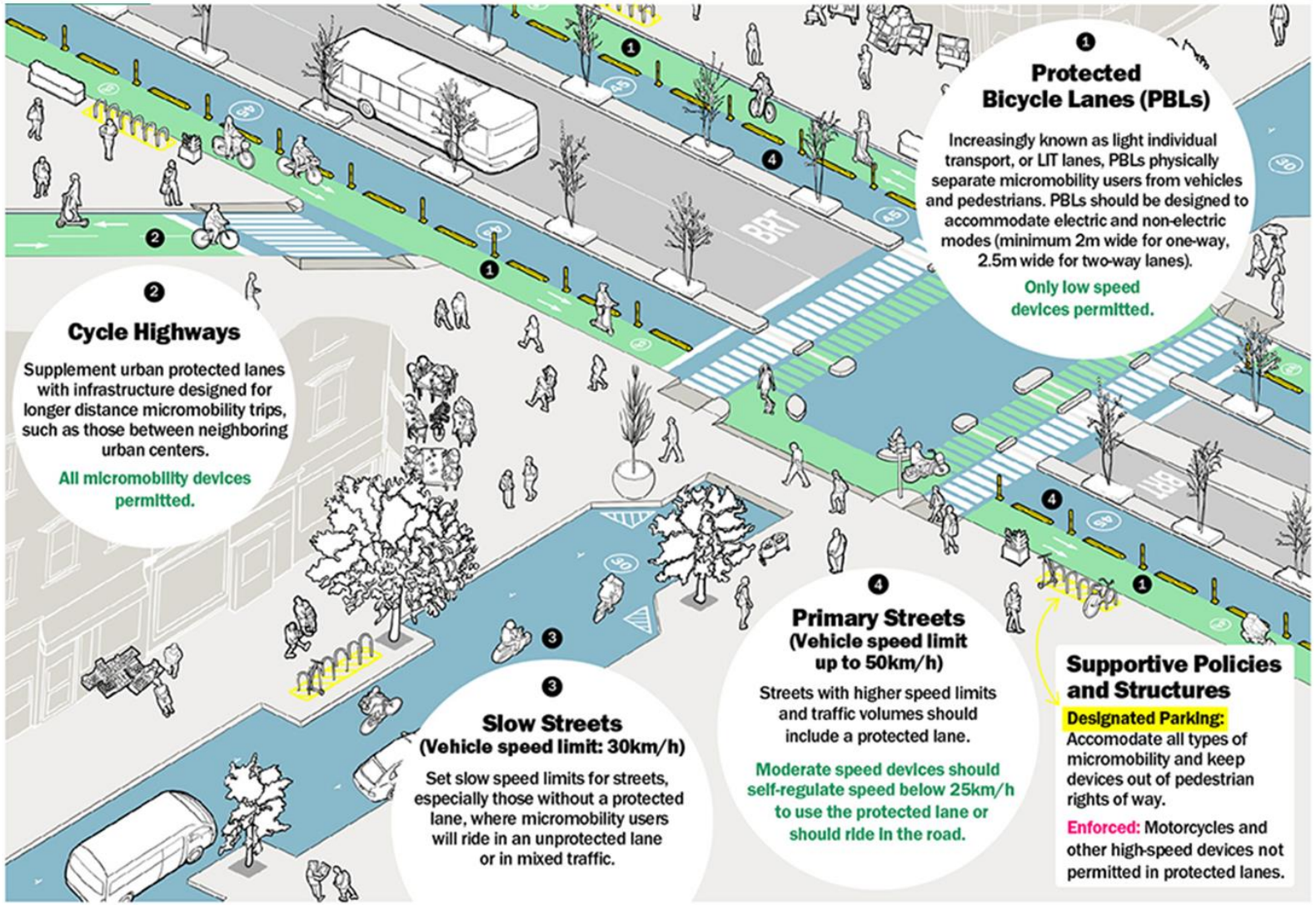


- Shared micro-mobility services provide new insights on the **trend of sharing economy** and its business models
- Opportunity of altering transportation supply due to the increased demand and providing a form of urban mobility that is **more friendly to the environment**
- Need to examine potential interrelations between shared micro-mobility services in a way to **understand public acceptance** and shed some light on the factors influencing the adoption
- Studies across general population groups suggest that **young people are early adopters!**

Micro-mobility

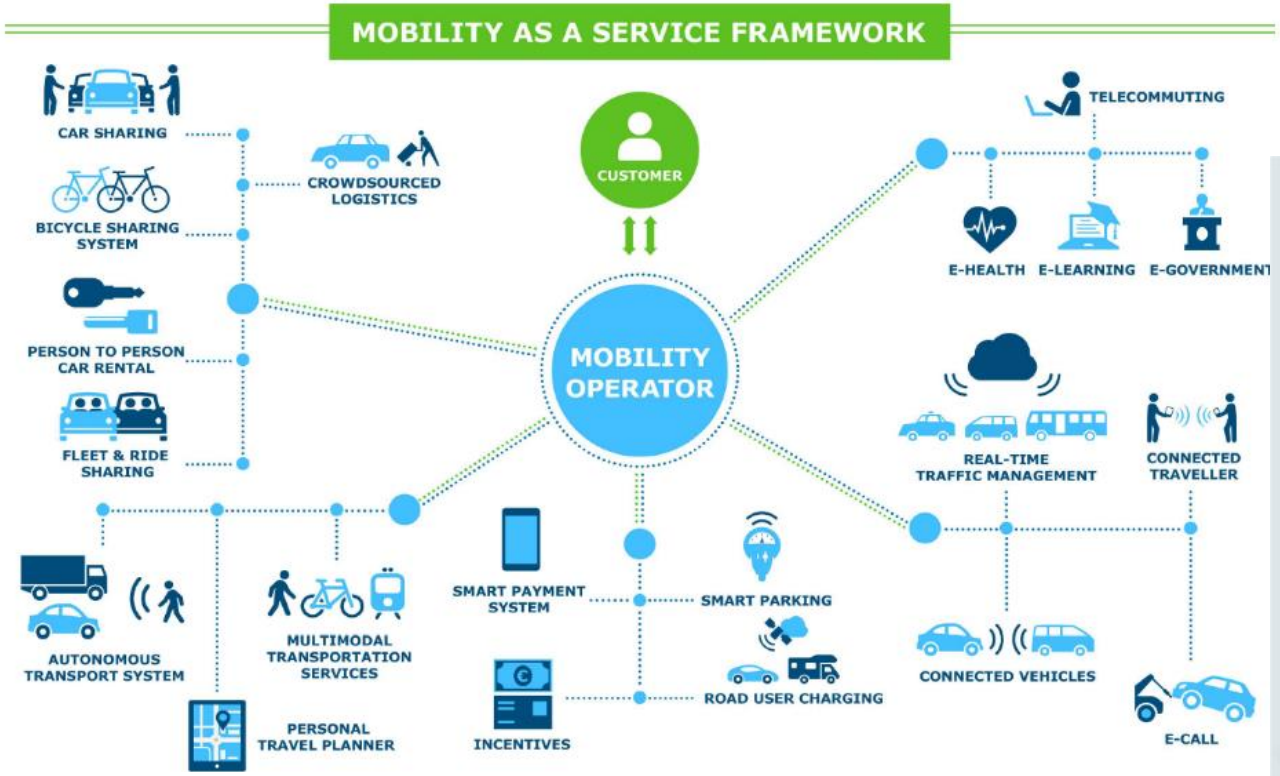
Micro-mobility

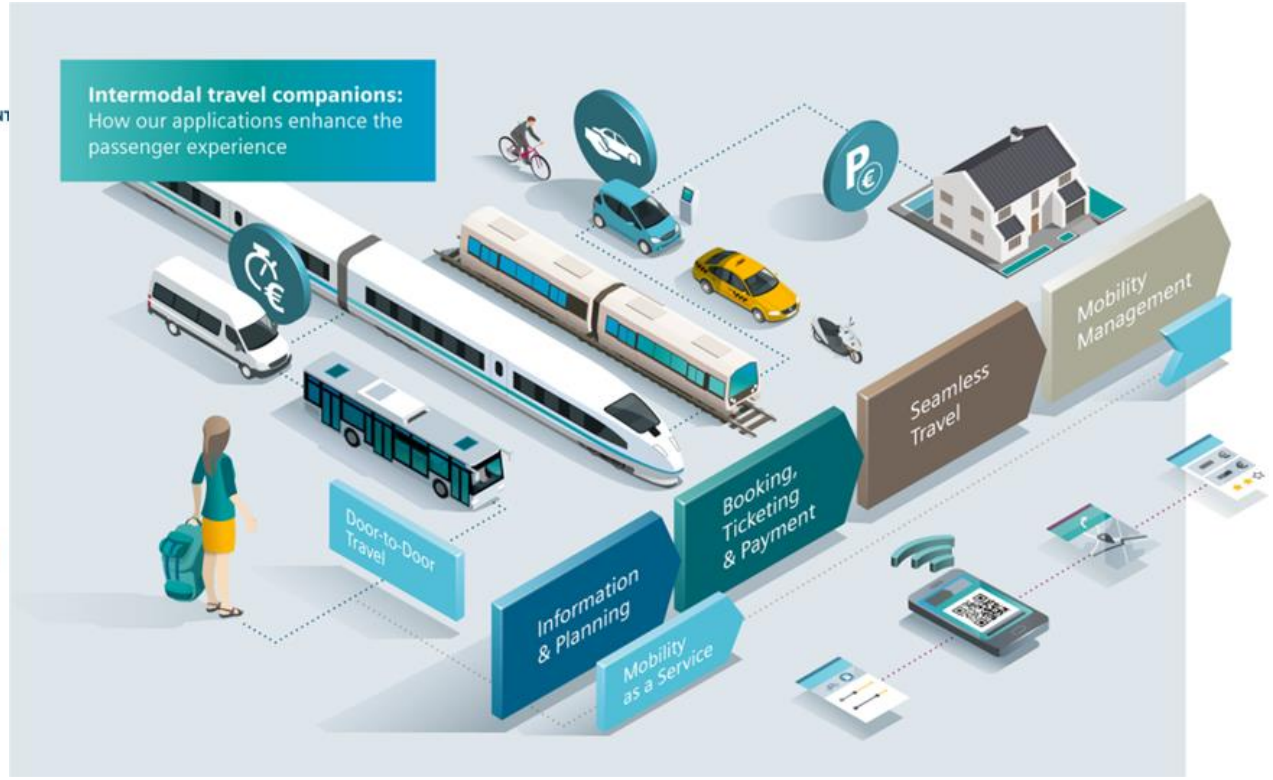
Safe "micromobility corridors" provide equitable access to more places for more people.



Multimodality – Mobility as a Service (MaaS)

- Multiple modes of transport (public and private)
- One single application + user-oriented approach
- Mobility packages, real-time information, multimodal journey planner and payment integration





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Current and Emerging Trends

- New European Urban Mobility Framework
  - Reduce GHG (>25% transportation in urban areas)
  - Promotion of sustainable transportation modes
  - Multimodality and micro-mobility services are part of a multimodal and integrated approach
- ‘Sharing’ economy is growing and affecting mobility in urban areas that includes additional travel alternatives *(car-sharing services, ride-hailing services, bike-sharing services, and other micro-transit services)*

The New European Urban Mobility Framework
(14 December 2021)

Current and Emerging Trends

- 2030 Target: reduction of greenhouse gas emissions to at least 55% below 1990 levels by 2030!!

- Climate neutrality by 2050!!!!

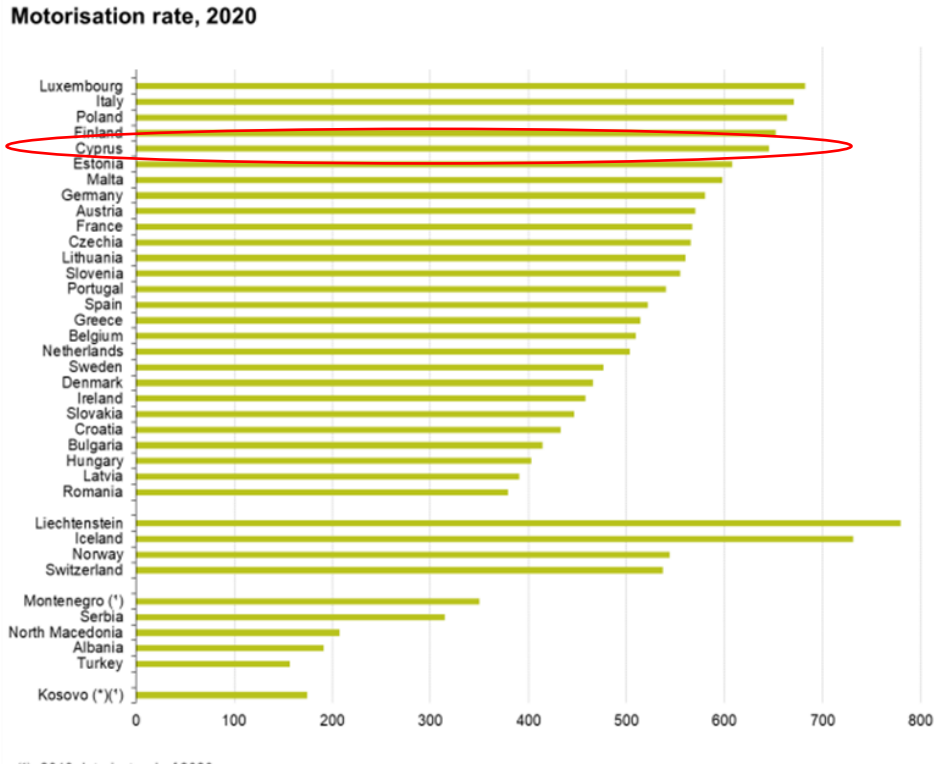
→Reduction of energy dependency –

Renewable energy sources!!!!!!

Climate Target Plan 2030

Challenges – Private vehicles

Motorization Rate



eurostat

Highest number of passenger cars

Luxembourg — 682

Italy — 670

Poland — 664

Cyprus — 645

per

thousand inhabitants

Modal Share

90.4%

2.9%

5.7%

~1%

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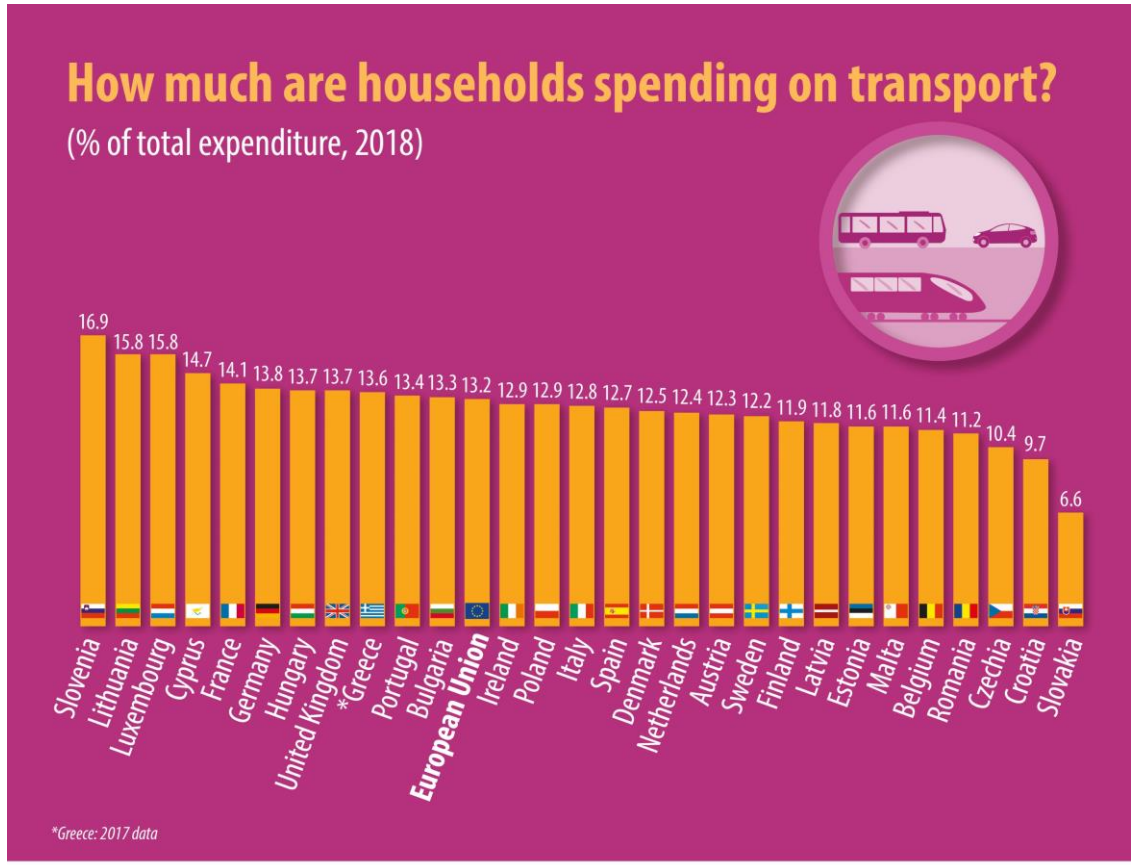
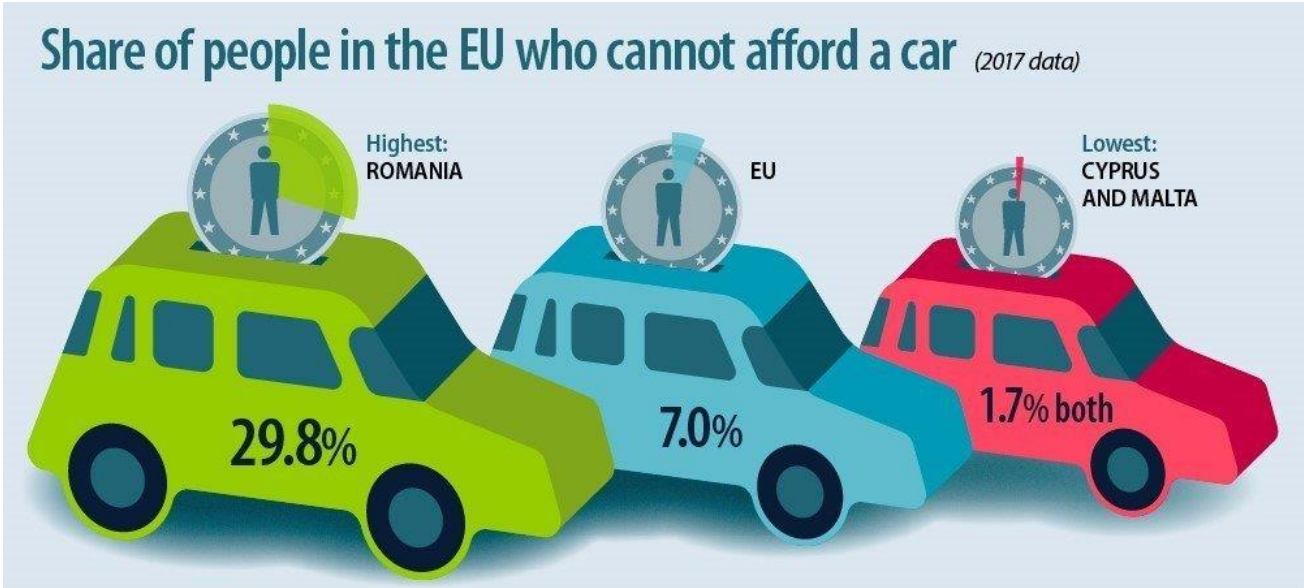
ΣΤΡΟΒΟΛΟΣ
Strovolos
ΤΡΟΟΔΟΣ
Troodos
B22 (A9)
3
ΛΕΥΚΩΣΙΑ
Lefkosia
A1

Challenges – Private vehicles

Cyprus → 4th place (gas dependency?)



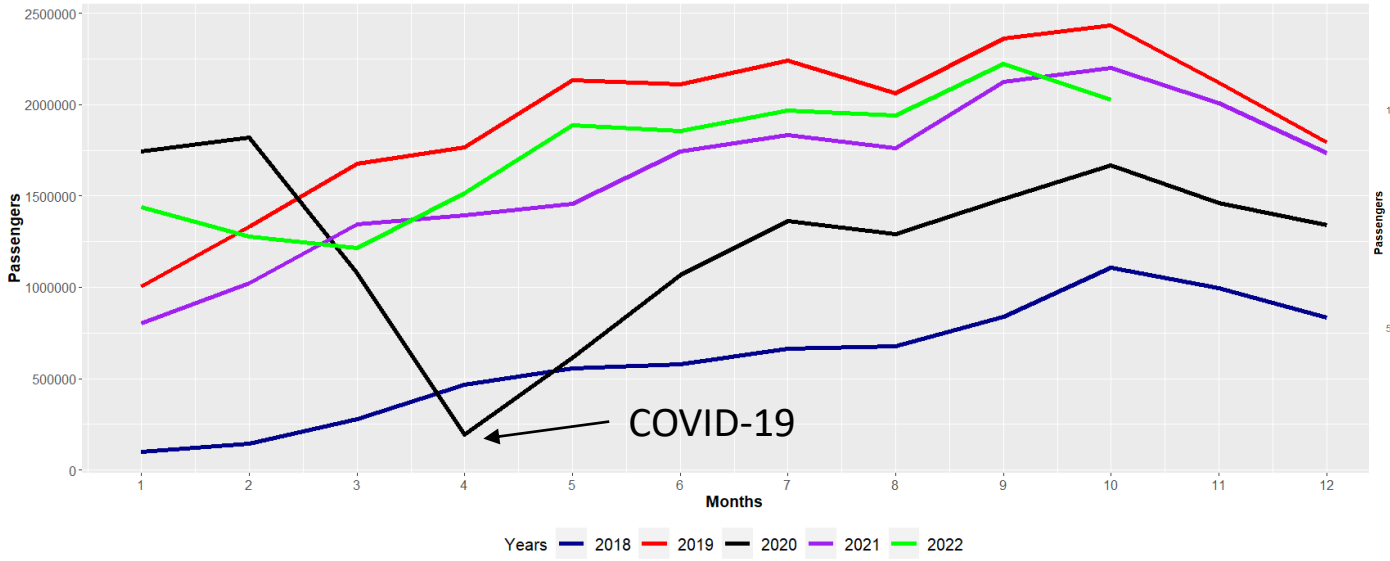
- Cyprus → lowest share of people that can afford purchasing a private vehicle



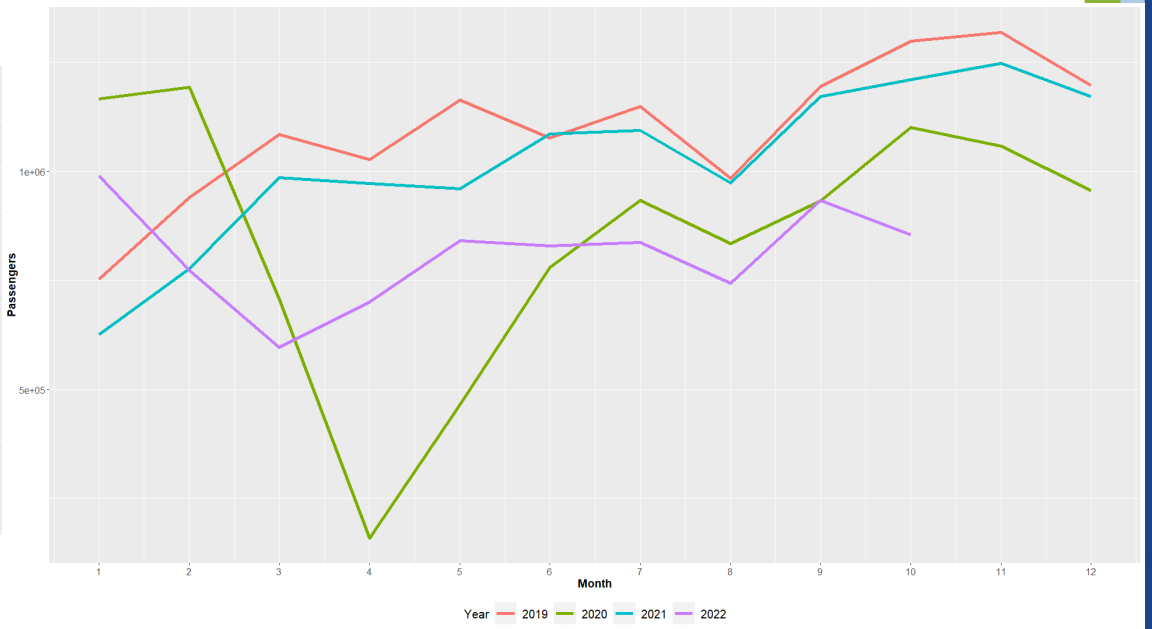
Challenges – Public Transportation

- Preliminary analysis from ridership data (2018-2022)
- Monthly passenger trips per year
- Temporal pattern (seasonality) is evident with higher ridership during summer vs winter
- 2022 total ridership still lower than 2019 total ridership
- 2022 slightly higher than 2021 (national-level)
- 2022 lower than 2021 (Nicosia)

Total Ridership (national-level)

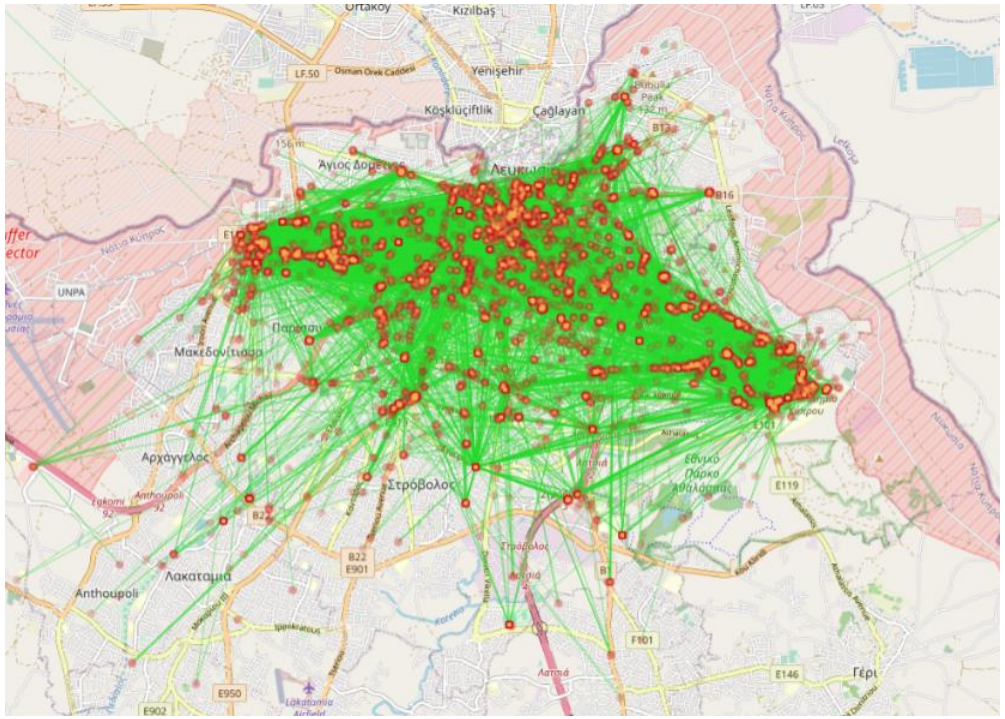


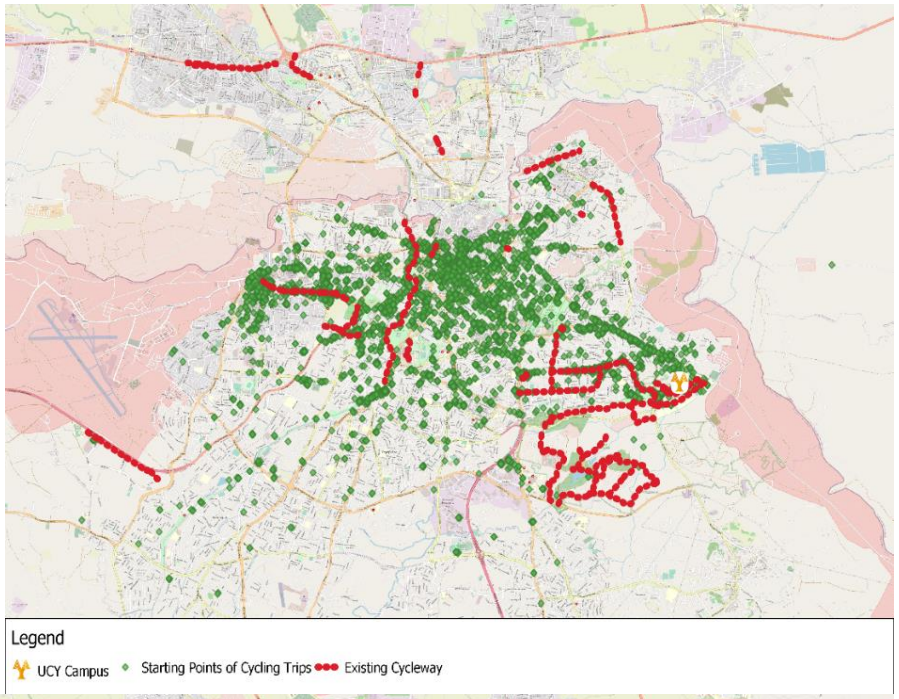
Total Ridership (Nicosia)

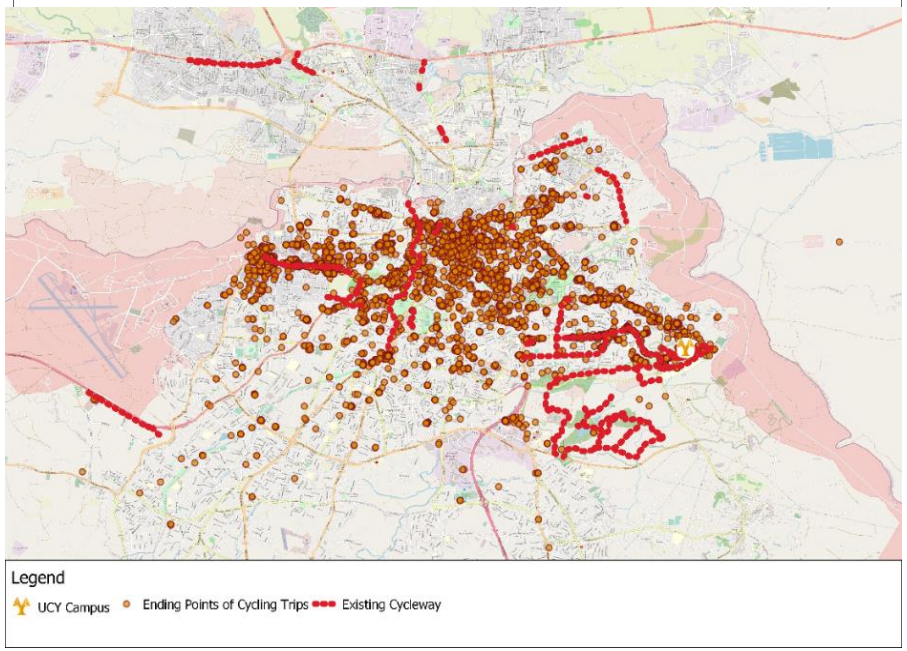


Challenges – Micro-mobility

- Nicosia's bike sharing system ODs (2019-2021)
- Infrastructure not continuous
- High density areas (multiple trips) without infrastructure
- Many trips close to UCY campus – are young people the early adopters / captive users of this service?







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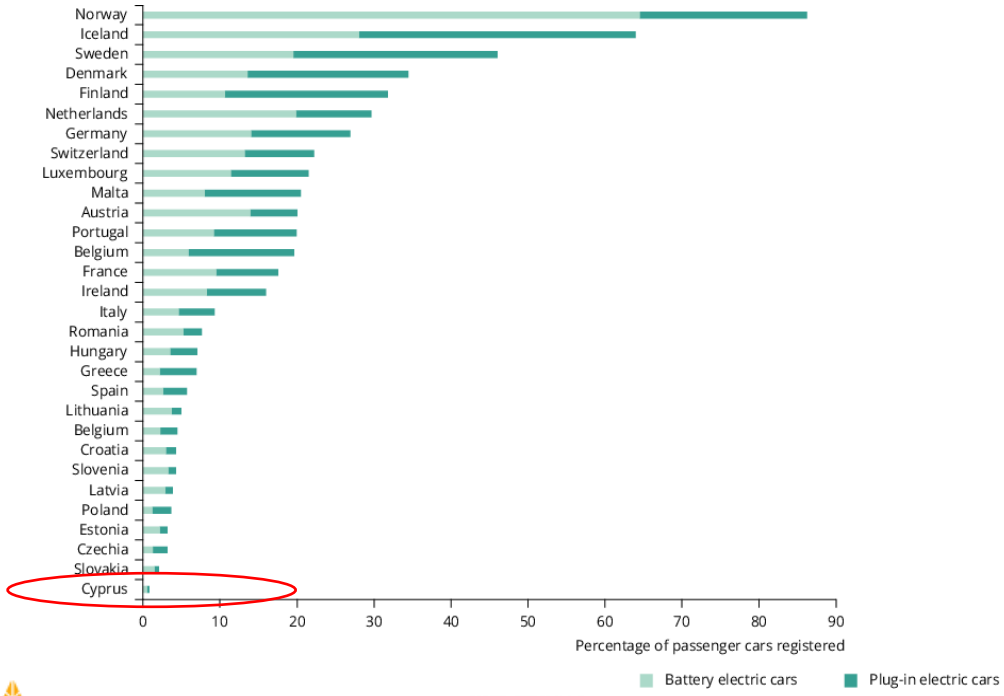
Challenges - EVs

- Cyprus:
  - ~0.4% EVs of new purchases (0.06% of total vehicles on the road vs 0.8% EU average)
- Germany:
  - ~25% EVs
- Greece:
  - ~5% EVs



New passenger cars by type of engine fuel, 2020
(number)

	Total	Petrol	Diesel	Alternative energy	of which: Battery - only electric	of which: Hydrogen and fuel cells
Belgium	439 038	268 148	151 970	18 920	15 044	:
Bulgaria	20 429	:	:	:	:	:
Czechia	198 400	:	:	:	:	:
Denmark	198 979	138 421	46 295	14 263	14 218	45
Germany	2 917 678	1 361 723	819 896	736 059	194 163	:
Estonia	19 295	13 164	5 123	1 008	344	:
Ireland	92 393	46 630	41 688	4 075	4 075	:
Greece	79 597	:	:	:	:	:
Spain	939 096	573 573	332 202	33 321	19 186	22
France	1 631 045	983 569	521 065	126 411	109 597	211
Croatia	95 577	28 079	62 972	4 526	639	:
Italy	1 437 259	773 479	505 406	158 378	30 930	:
Cyprus	10 237	7 130	3 065	42	42	0
Latvia	13 725	8 363	4 870	492	351	0
Lithuania	40 878	32 922	7 042	914	480	0
Luxembourg	45 189	:	:	:	:	:
Hungary	128 196	93 177	31 606	3 413	3 047	0
Malta	4 602	3 342	1 062	198	178	0
Netherlands	355 431	267 482	12 963	74 986	72 858	147
Austria	248 740	133 151	99 196	16 393	15 972	14
Poland	1 179 776	637 763	413 508	128 505	4 619	0
Portugal	202 986	:	:	:	:	:
Romania	126 329	79 244	34 963	12 122	2 844	:
Slovenia	53 367	31 529	16 918	4 920	1 720	:
Slovakia	76 300	:	:	:	:	:
Finland	96 418	75 765	14 567	6 086	4 245	0
Sweden	293 771	194 265	67 981	31 525	27 981	5
Iceland	10 622	5 706	2 327	2 586	2 551	:
Liechtenstein	1 510	922	422	166	164	0
Norway	147 120	51 138	19 178	76 804	76 778	15
Switzerland	238 700	160 700	57 500	20 400	19 800	0
Montenegro (¹)	3 196	2 026	1 164	6	:	:
North Macedonia	29 952	:	:	:	:	:
Albania	43 661	10 336	32 953	372	239	0
Serbia	:	:	:	:	:	:
Turkey	601 525	319 023	247 626	34 876	1 617	0
Bosnia and Herzegovina	41 146	5 387	35 570	189	11	0
Kosovo (¹)(*)	22 587	0	22 587	0	0	0

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Challenges - EVs

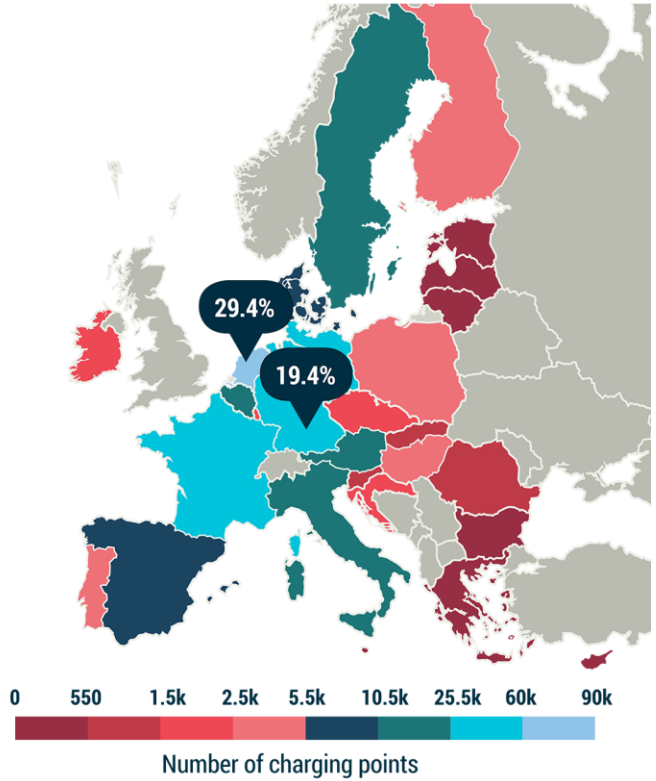
DISTRIBUTION OF ELECTRIC CAR CHARGING POINTS ACROSS THE EU

Some 50% of all charging points:
Concentrated in just 2 EU countries

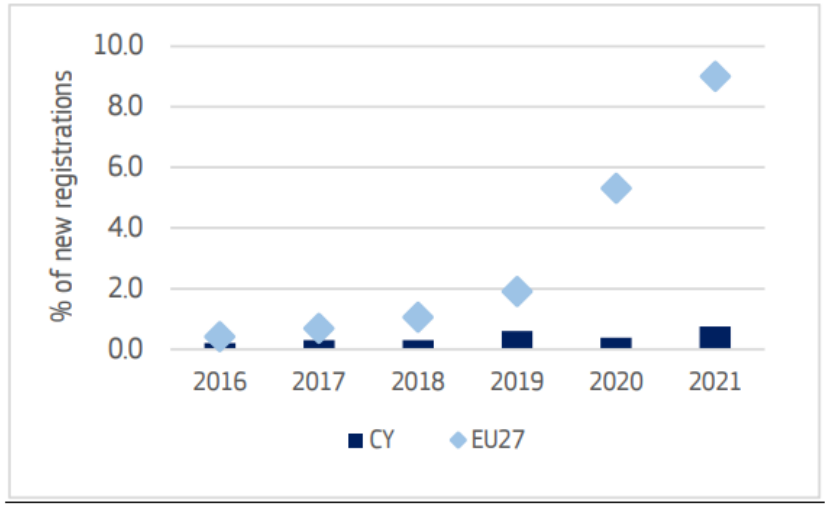
29.4%	Netherlands	19.4%	Germany

Top 5: Fewest charging points in 2021

Cyprus		Malta		Lithuania
57		98		207
	Estonia		Latvia	
	385		420	



Share of zero emission vehicles (% of new registrations)



Zero emission vehicles (passenger cars) include battery and fuel cell electric vehicles (BEV, FCEV).
Source: European Alternative Fuels Observatory.

			2015	2016	2017	2018	2019	2020
Mobility	GHG emissions intensity of transport (to GVA) [7]	kg/EUR'10	0.18	0.23	0.33	0.45	0.26	0.23
	Share of zero emission vehicles [8]	% in new registrations	0.0	0.2	0.3	0.3	0.6	0.4
	Number of plug-in electric vehicles per charging point		0	2	6	9	13	9
	Share of electrified railways	%	-	-	-	-	-	-
	Congestion (average number of hours spent in road congestion per year by a representative commuting driver)		-	-	35.7	37.3	37.7	-

→ Emphasize more on
EV infrastructure rollout?

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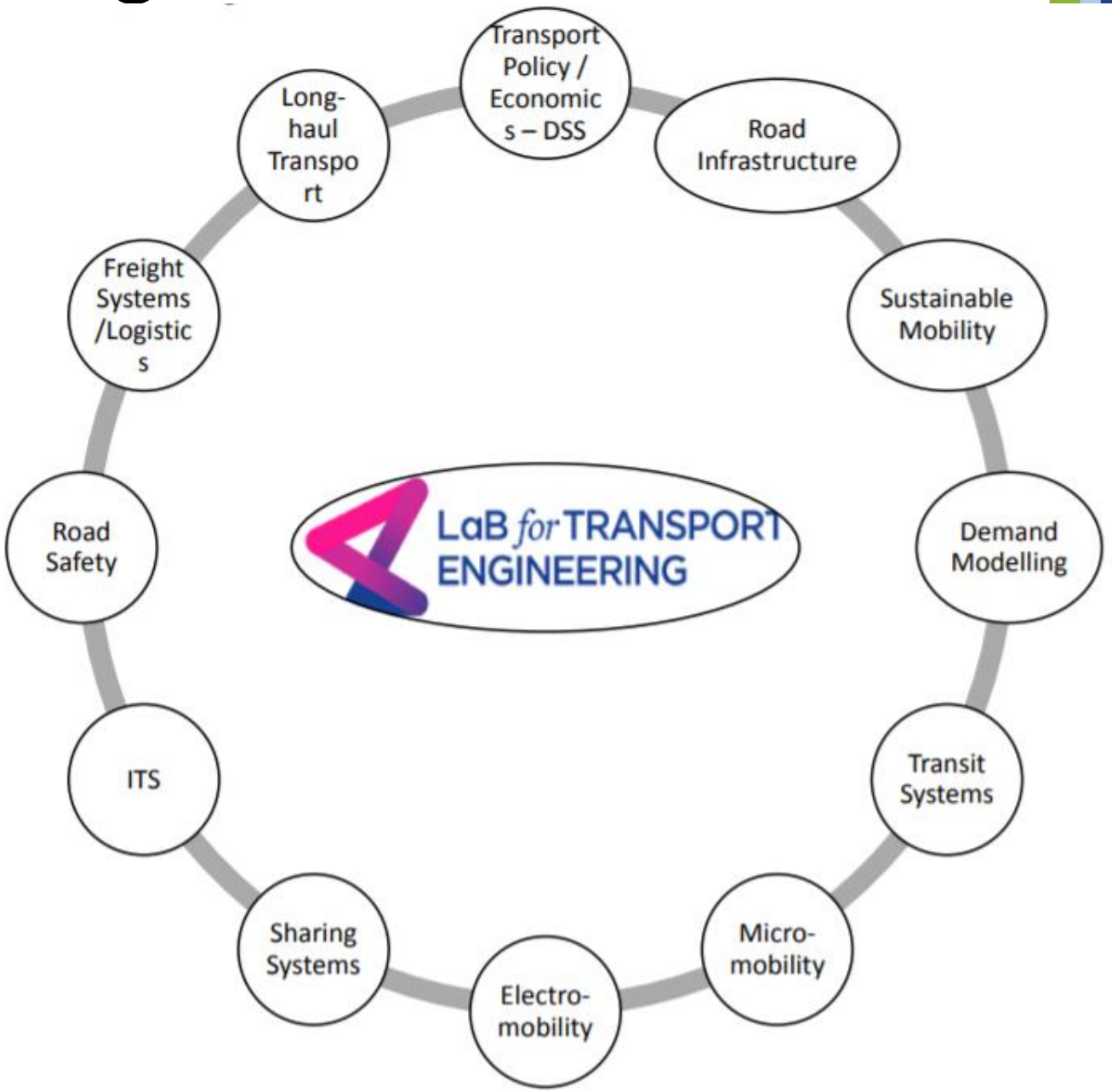
Research Areas

→ Activities in Cyprus

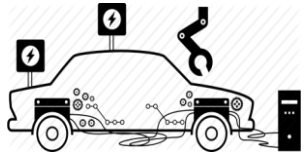
(MTCW – Public Transportation, The Cyprus Institute, etc.)

→ Synergies with research institutions and groups across Europe and worldwide

→ Outputs acknowledged by research community worldwide and presented in international conferences and published in academic journals



LaB – Holistic Approach



Emerging transportation services

Insights on people's acceptance on these services
Human-centric approach

Focus on transportation planning + engineering
Strategic plan (national, regional, local)
Need to better understand users

Interdisciplinary effort – synergies (urban planning, economics, social sciences)

Market analysis - early adopters, other groups?

Embrace trend of shared transportation

Incorporate aspects of smart transportation (CS, ICT)

Impacts on vehicle ownership and mode choice decisions?

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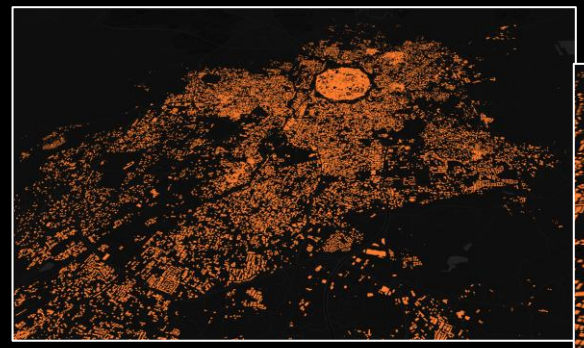
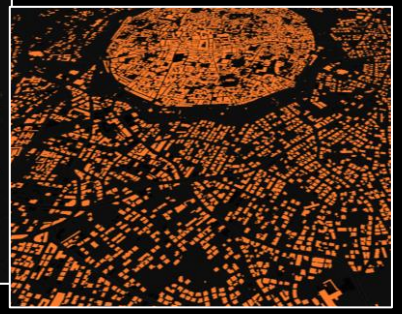
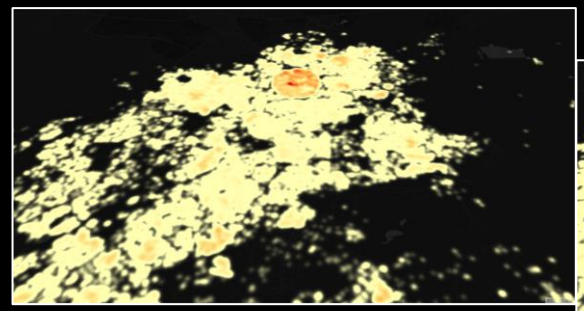
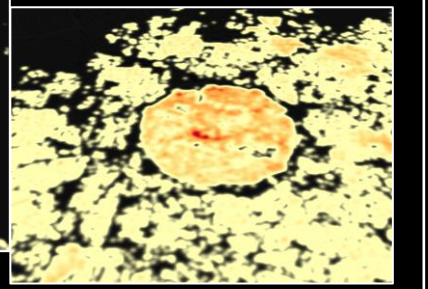
LaB – Holistic Approach – Demand Analysis



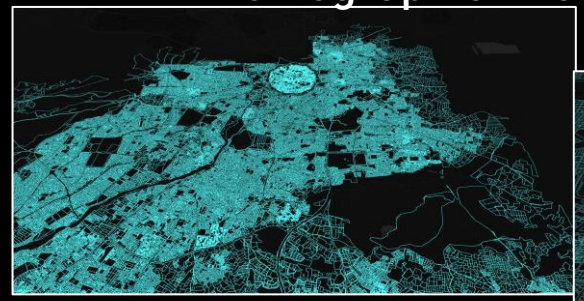


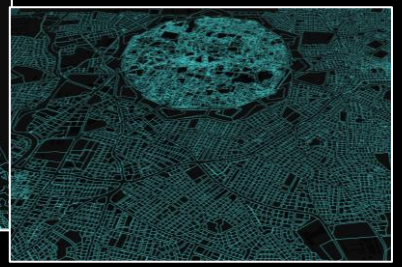
Demographic Analysis - Buildings



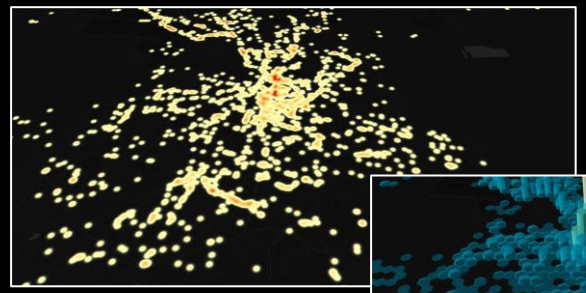


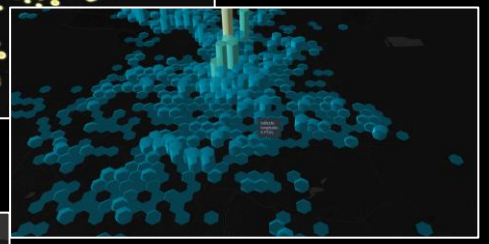
Demographic Analysis - Parcels



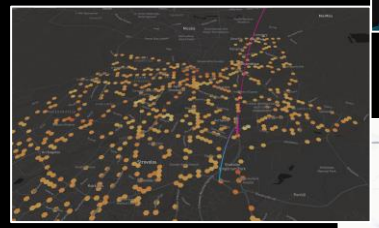


POIS - Points of Interest

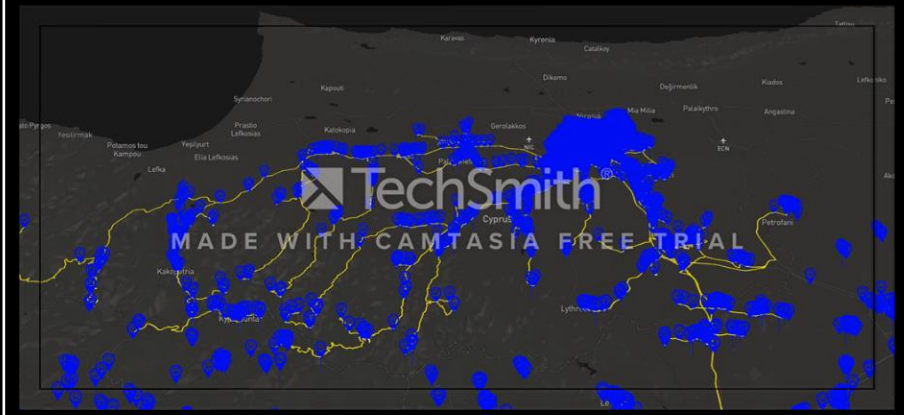




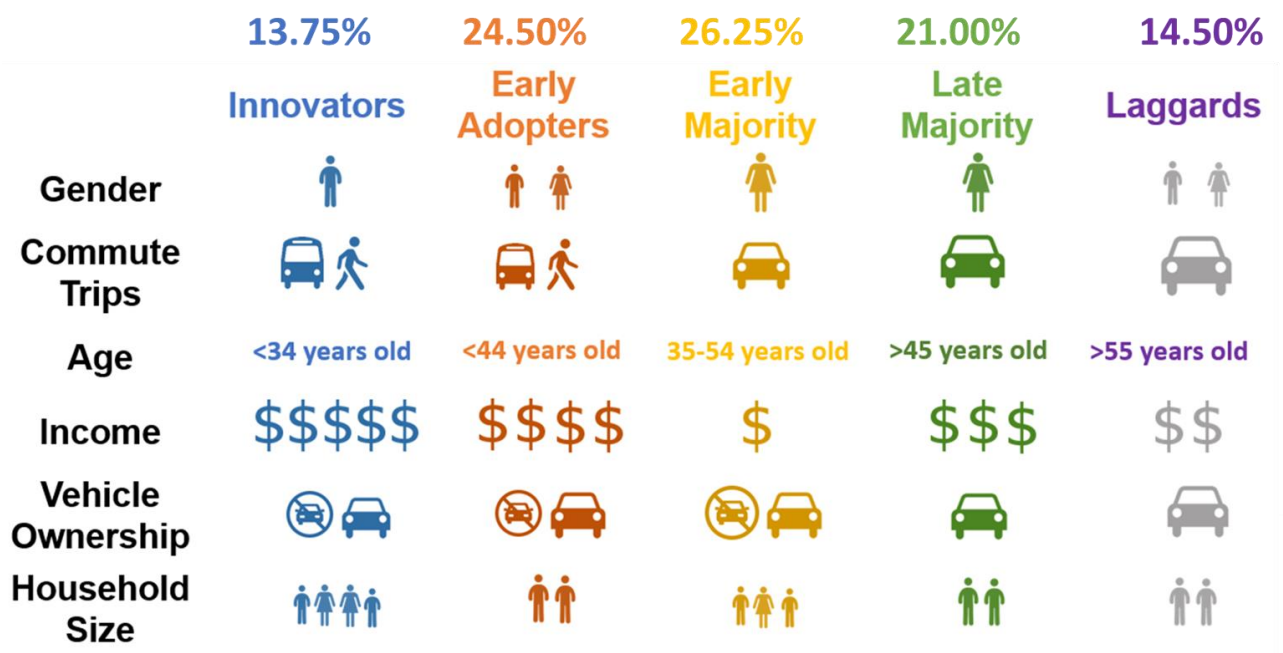
Stop Connectivity

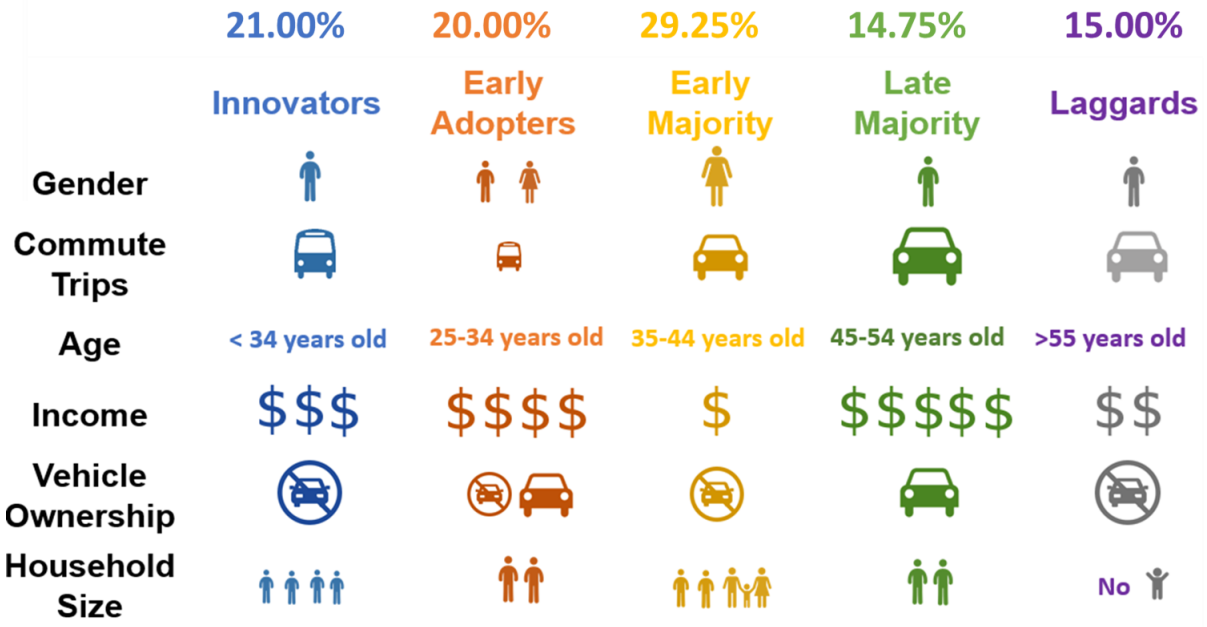


Dynamic map



LaB – Holistic Approach – Market Analysis





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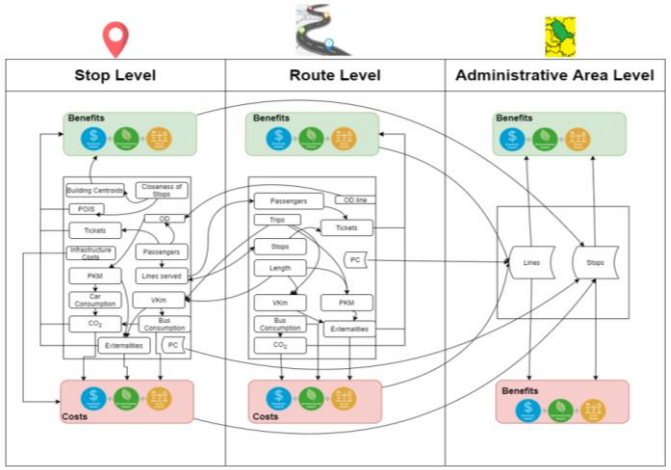
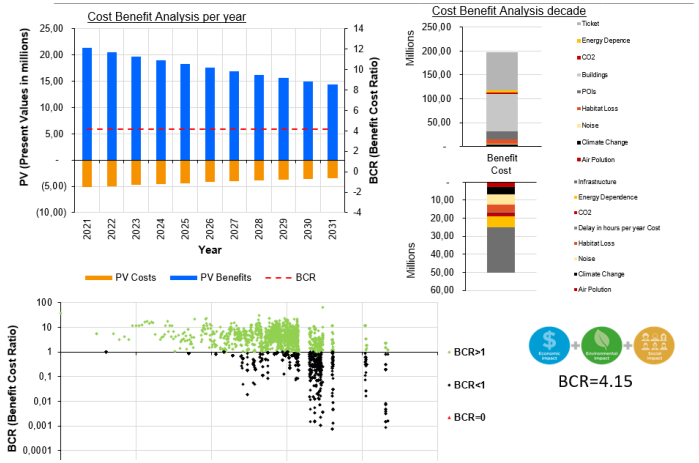
LaB – Holistic Approach – Public Transportation

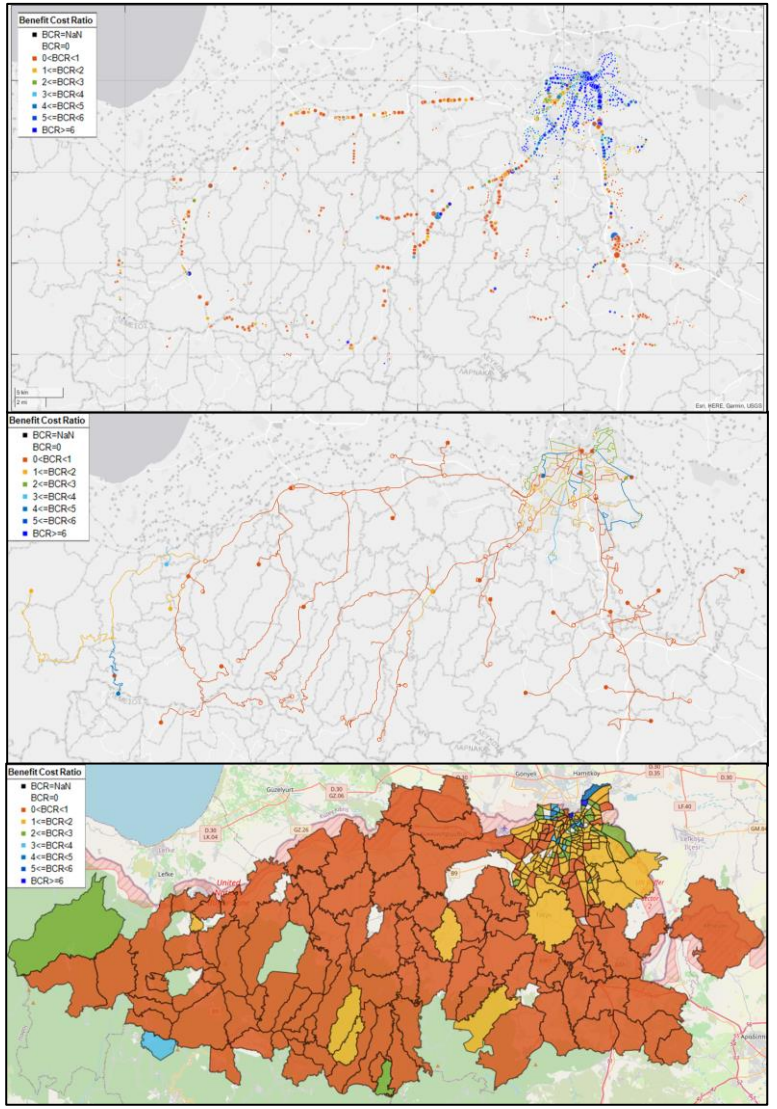
Evaluation-Sustainability Analysis

Cost-Benefit Analysis



Overall Stops





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LaB – Holistic Approach – Multimodality @UCY

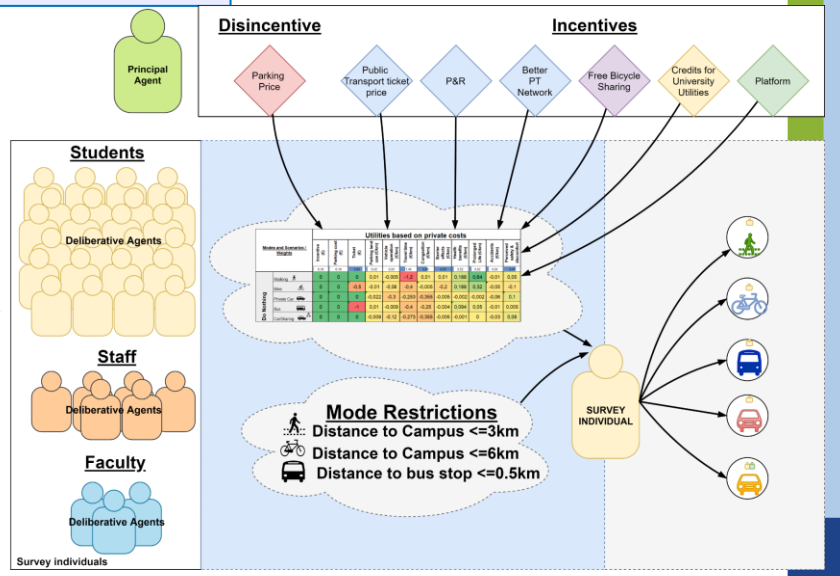
- WTP of parking
- Different parking pricing scheme:
  - €1/day
  - €2/day
  - €2/day discounts for carpooling users
  - €2/first 3 hours and €0.5 every 90 minutes
- WTP of parking in off-campus facilities

- Ride-matching app
- As a driver
- As a passenger
- Different time periods
- App characteristics

- New routes
- WPT of bus
- Free ride under various scenarios
- (on-demand) university shuttle bus service improvements

- Shared micro-mobility services
  - Shared bikes
  - Shared e-bikes
  - Shared e-scooters
- WTP
- Different trip purposes

- Incentives reducing car use and increasing modal share of sustainable modes
- Outreach activities



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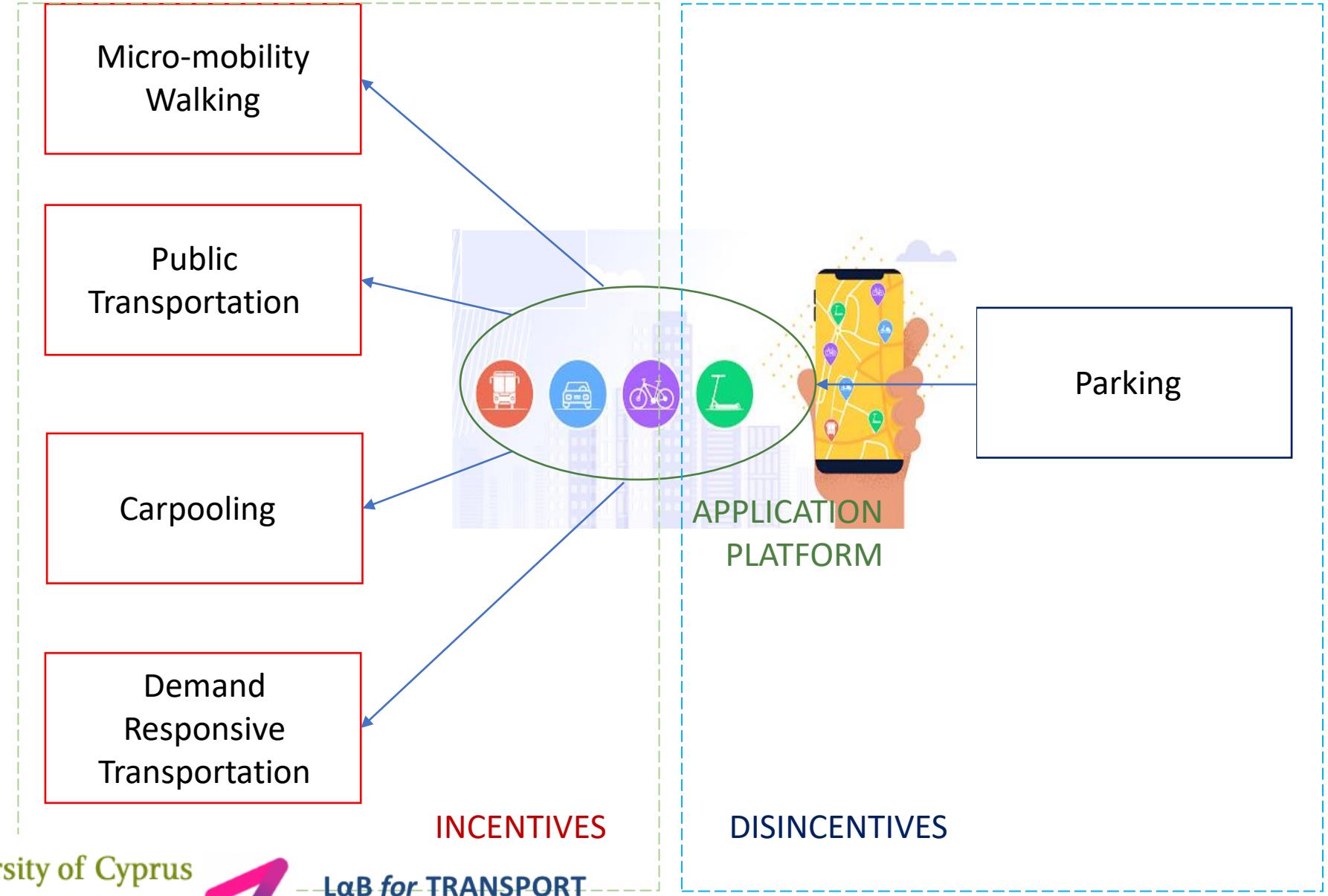
LaB – Holistic Approach – Multimodality @UCY



LaB – Holistic Approach – Multimodality @UCY

WP3: Survey Design

1st section: Socio-demographic questions

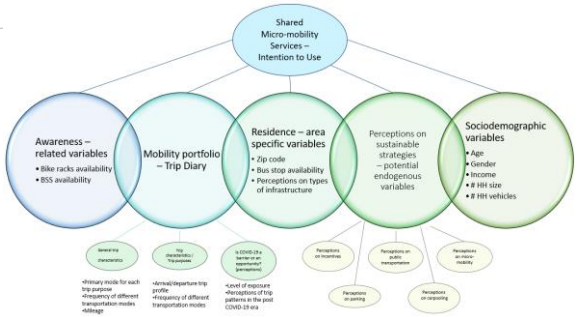
2nd section: Trip Characteristics

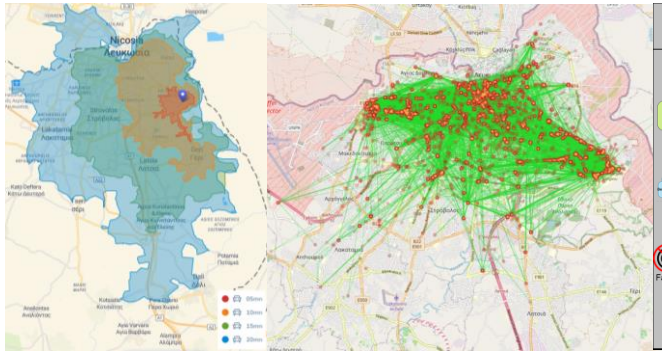
- Residence-area specific questions on trip characteristics
- Questions on general trip characteristics
- Questions on commuting trip characteristics

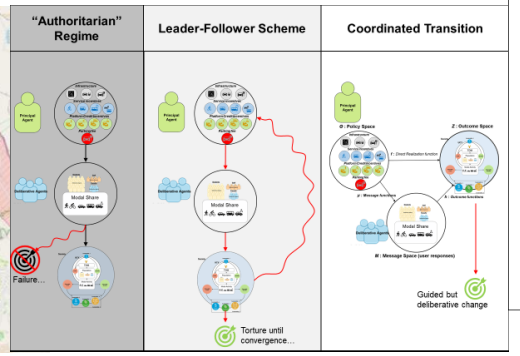
3rd section: Questions on level of awareness regarding shared micro-mobility services.

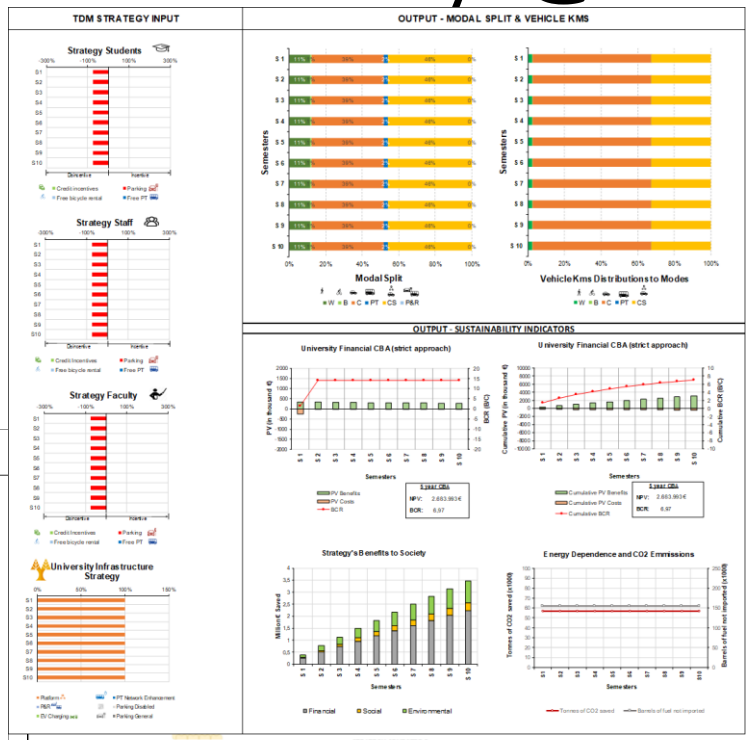
4th section: Questions related to the pandemic and travel behavior perceptions

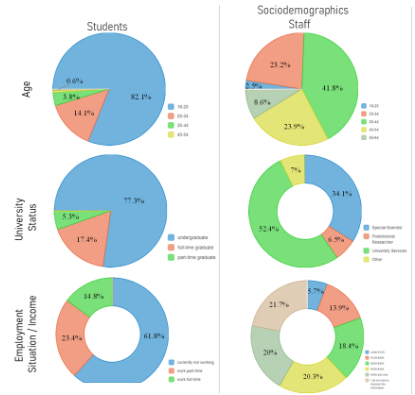
5th section: Perceptions on different sustainable strategies including the behavioral intention to use shared micro-mobility services

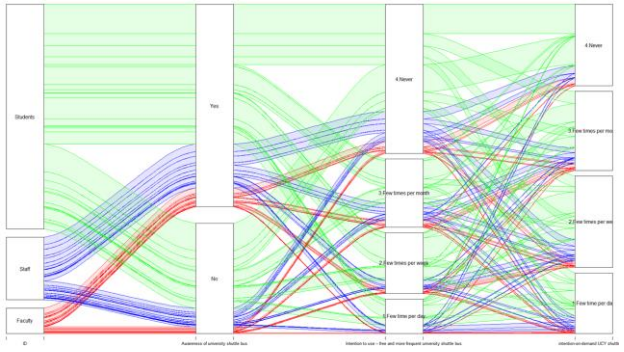


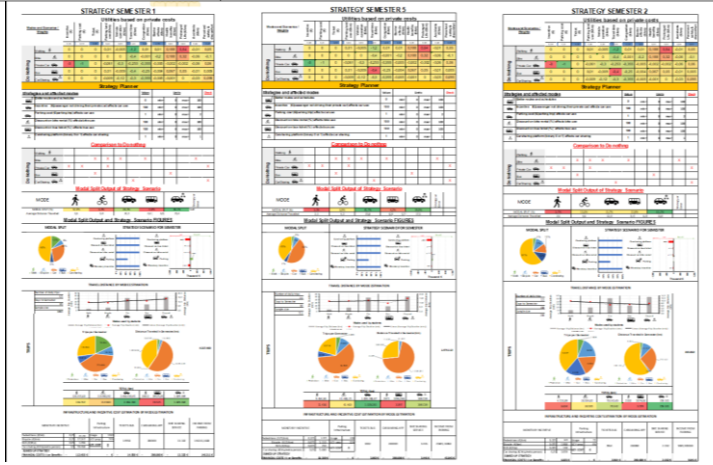












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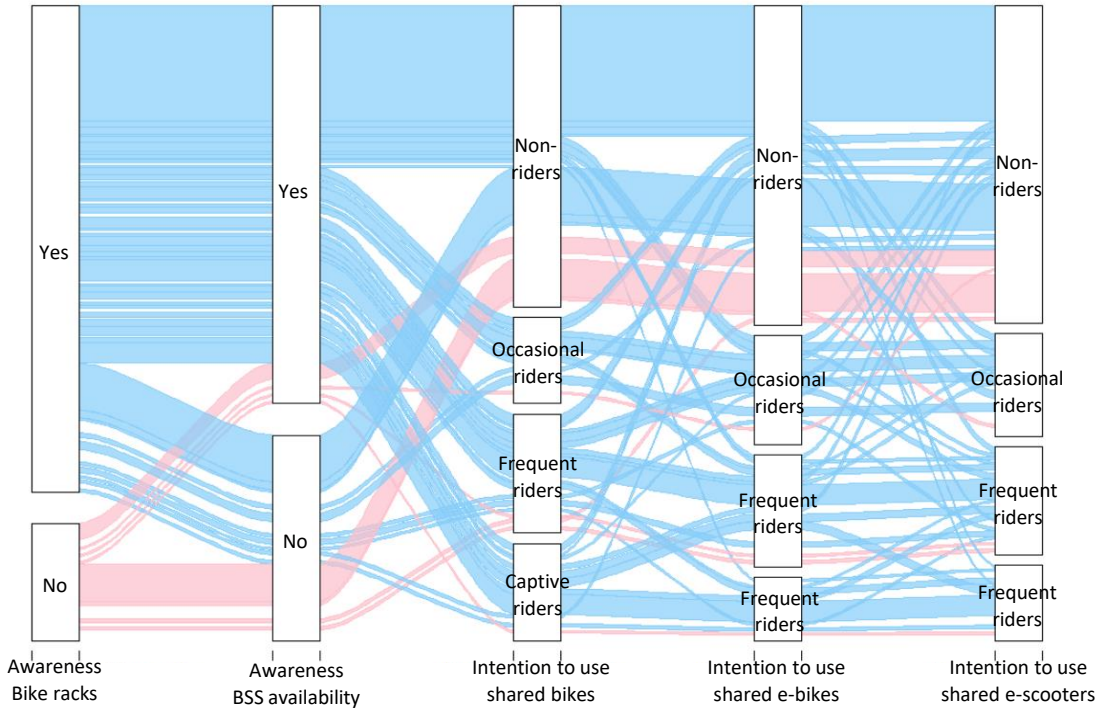
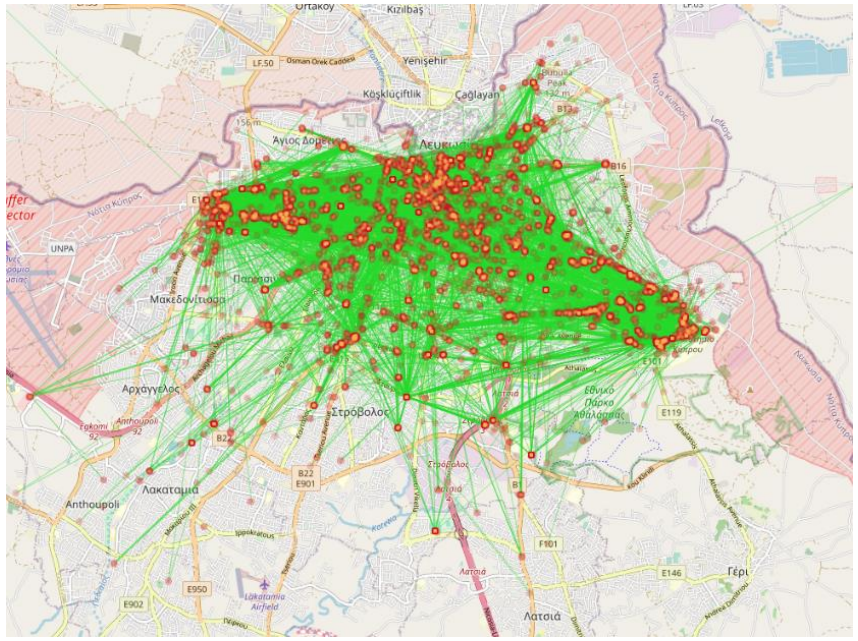
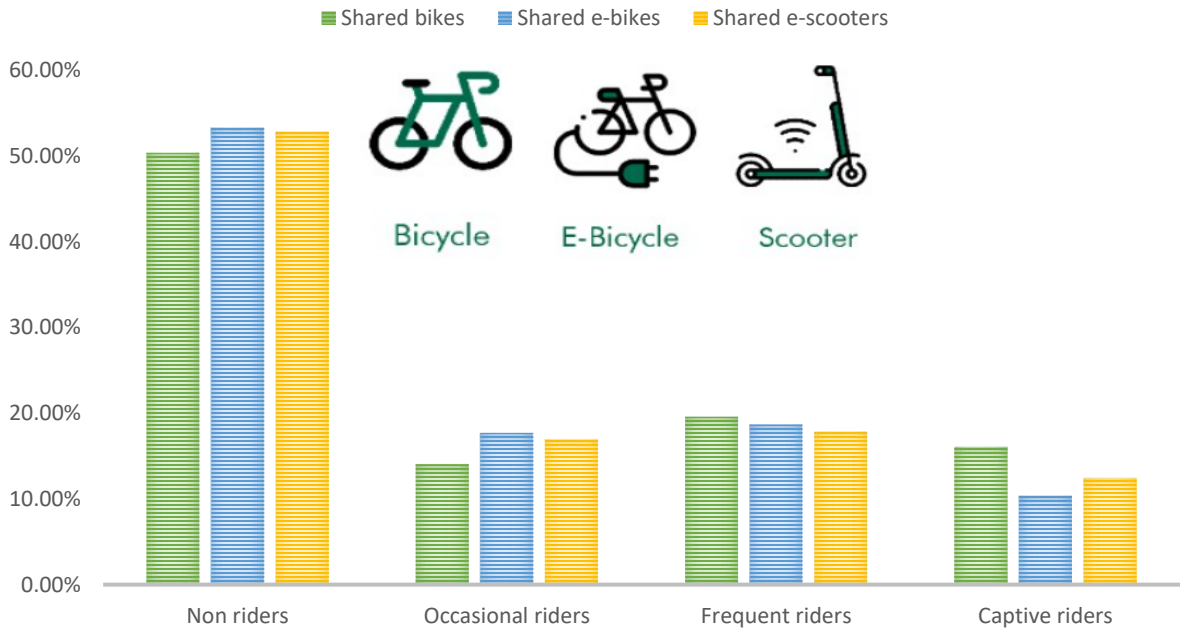
LaB – Holistic Approach – Shared Micro-mobility





- Young people
- Unemployed
- Household size 1 or 2 people
- Household vehicle size 0 or 1
- Reside close to university
- Multimodal lifestyle (use alternative modes)
- Awareness on infrastructure and sharing schemes
- The pandemic can serve as an opportunity
- Incentives



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LaB & The Cyprus Institute – Holistic Approach

Foresights on Emerging Transportation Technologies Adoption in Cyprus
and Development of a Policy-making Toolkit for Maximizing Sustainability

Policy-making toolbox evaluating modal shift to new transportation technologies in Cyprus

Consider national- or EU-driven target goals

Capture consumer choices and behavioral attitudes

Design state-of-the-art national travel survey

Utilization of active and passive smartphone data

Forecast how people will travel (travel demand modeling)

Stochastic microsimulation analysis (activity-based analysis)

Promotes a plan for the shift to sustainable transportation

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ΤΜΗΜΑ
ΔΗΜΟΣΙΩΝ ΕΡΓΩΝ

ΚΛΑΔΟΣ
ΒΙΩΣΙΜΗΣ
ΚΙΝΗΤΙΚΟΤΗΤΑΣ

Ευχαριστώ για την προσοχή σας

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