Table 11: Correspondence between mentioned use case and type of participant who reported it

	Citizens	Organizations
Passenger transport use cases		
• Autonomous e-hailing pod	☒	☒
• Demand responsive transport with autonomous bus	☒	☒
• Autonomous taxis or mini vans	☒	☒
• Autonomous employee transportation vehicle	☒	☒
• Autonomous transportation vehicle on-campus hospital	☒	☒
• Autonomous pod to hospital	☒	☒
• Car-shuttle train system (Platooning pod)	☒	☐
• Private pod	☒	☐
• Individual pod	☒	☐
• Scheduled bus/shuttle	☒	☐
• Cable car	☒	☐
Freight transport use cases		
• Delivery robot	☒	☒
• Garbage collection / street cleaning vehicle	☐	☒
• Last mile delivery by vans	☒	☒
• Delivery drone	☒	☒
• Manufacturing plant robot/drone	☒	☒
• Automated farm and construction vehicles	☐	☒
• Autonomous trucks	☒	☐
• Platooning trucks	☒	☐
• Platooning gondolas	☒	☐
• Autonomous vehicles for military use	☒	☐

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The following table shows how extent the use cases have been proposed by each country.

Table 12: Correspondence between mentioned use case and country who reported it

	CY	DE	SP	FR	GR	NL	PL	UK
Passenger transport use cases								
• Autonomous e-hailing pod	☒	☒	☒	☒	☒	☒	☒	☒
• Demand responsive transport with autonomous bus	☒	☒	☒	☒	☒	☒	☒	☒
• Autonomous taxis or mini vans	☒	☒	☒	☒	☒	☒	☐	☒
• Autonomous employee transportation vehicle	☐	☒	☒	☒	☐	☒	☒	☒
• Autonomous transportation vehicle on-campus hospital	☐	☒	☐	☒	☐	☐	☐	☐
• Autonomous pod to hospital	☒	☒	☒	☒	☒	☐	☒	☒
• Car-shuttle train system (Platooning pod)	☐	☒	☐	☒	☐	☒	☐	☒
• Private pod	☒	☒	☒	☒	☒	☐	☐	☒
• Individual pod	☒	☐	☒	☐	☐	☒	☐	☒
• Scheduled bus/shuttle	☒	☒	☒	☒	☒	☐	☒	☒
• Cable car	☐	☒	☐	☐	☐	☐	☒	☒
Freight transport use cases								
• Delivery robot	☒	☒	☐	☒	☒	☒	☒	☒
• Garbage collection / street cleaning vehicle	☐	☐	☒	☐	☐	☐	☒	☐
• Last mile delivery by vans	☒	☒	☒	☒	☒	☐	☒	☒
• Delivery drone	☒	☒	☒	☒	☒	☐	☒	☒
• Manufacturing plant robot/drone	☐	☐	☐	☒	☒	☐	☐	☐
• Automated farm and construction vehicles	☐	☐	☐	☐	☐	☐	☐	☒
• Autonomous trucks	☒	☒	☒	☐	☒	☐	☒	☐
• Platooning trucks	☐	☐	☐	☐	☒	☒	☐	☐
• Platooning gondolas	☐	☒	☐	☐	☐	☐	☐	☐
• Autonomous vehicles for military use	☐	☐	☐	☒	☐	☐	☐	☐

As it can be observed, there are some use cases that were not reported in some specific countries.

Secondly, the average relevance of the use cases for passengers is shown in the Figure 15. The most frequent use case was autonomous e-hailing shared pods, suggested by 39% of all participants from all countries, followed by demand-responsive buses (27%) autonomous taxis or mini vans (26%) and scheduled buses and shuttles (24%). Autonomous taxis or mini vans were mainly mentioned by people who are living in rural areas and suburbs, and have fewer options available.

The rest of the use cases proposed were less frequently mentioned. Private pods were suggested by the 11% of participants. Autonomous employee transport vehicles connecting homes with workplaces were mentioned by 7%.

Pods travelling to hospitals from other locations were mentioned by 8% of participants. Another scenario consisting of on-campus hospital transportation was suggested by 2%. All these scenarios have been mentioned in all countries, except in the Netherlands.

Other use cases include car-shuttle train systems (Platooning pod) (4%), individual pod (3%) and cable cars (2%).

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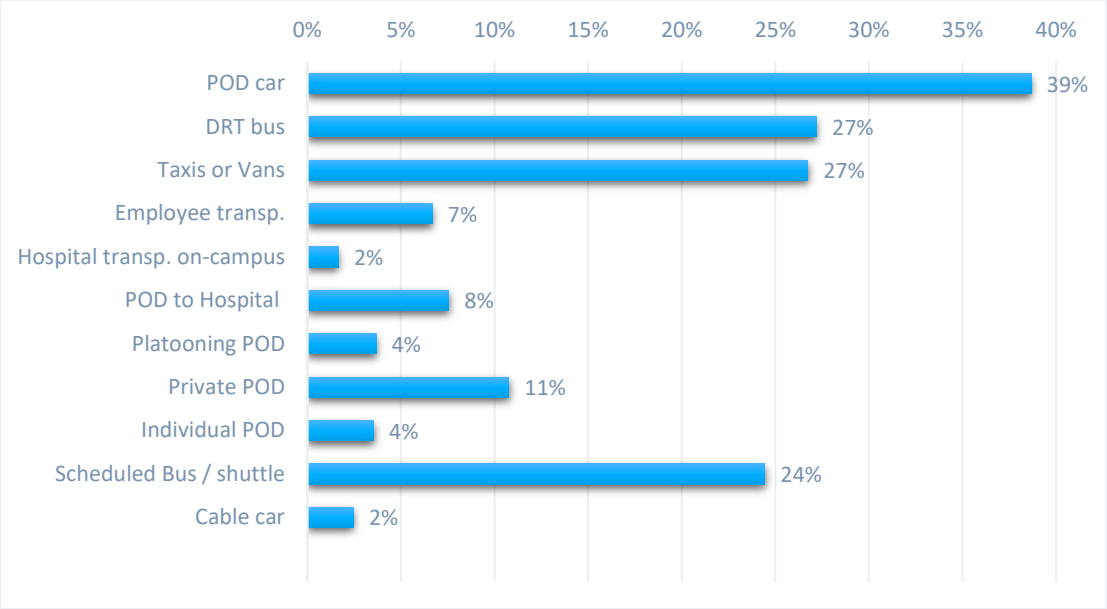

Figure 15 Types of AVs for transport passengers proposed by citizens and organizations

Following Figure 16 shows the relevance per country. The values represent how many participants reported each use case per country.

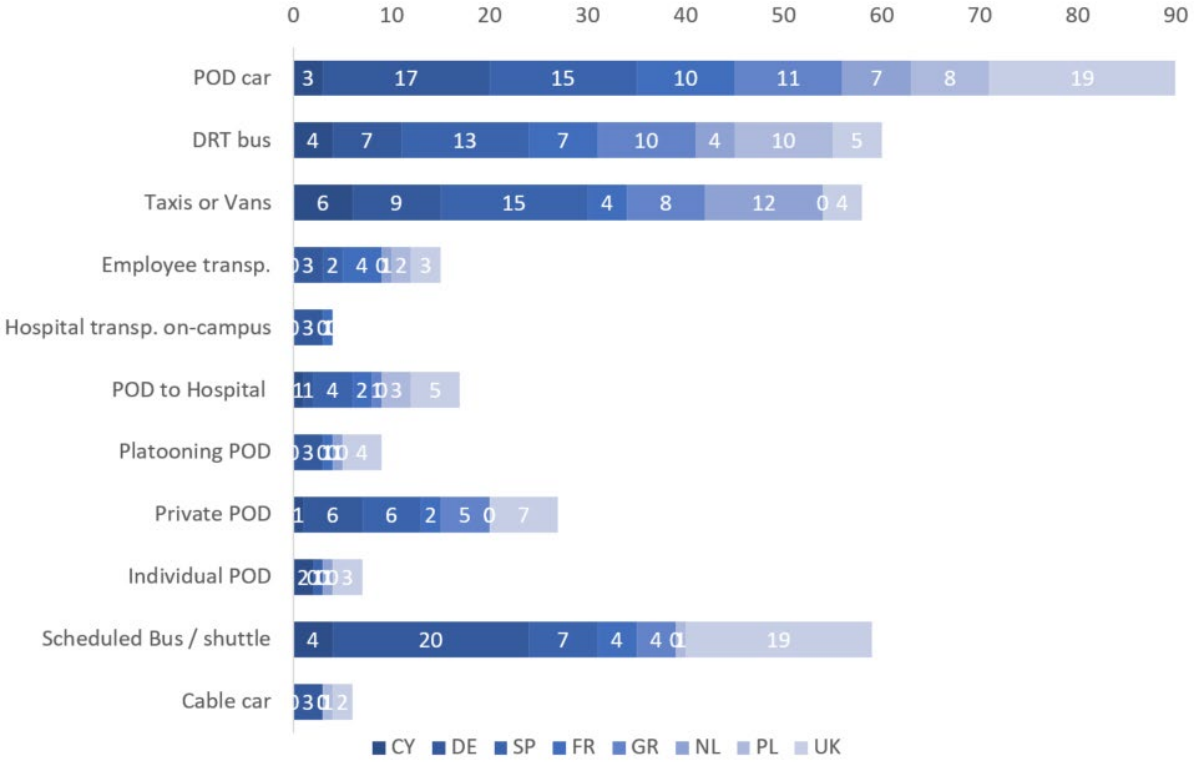

Figure 16. Relevance of AVs for transport passengers reported by citizens and organizations

Per country, the following conclusions have been found according to relevance of each use case:

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Autonomous e-hailing car on demand (pod car) was reported by 19 participants from UK, 17 from Germany, 15 from Spain, 11 from Greece, 10 from France, 8 from Poland, 7 from the Netherlands and 3 from Cyprus.

Demand-responsive transport (drt) bus was reported by 13 participants from Spain, 10 from Greece and Poland, 7 from Germany and France, 5 from UK and 4 from Cyprus and the Netherlands.

Autonomous taxis or vans were reported by 15 participants from Spain, 12 from the Netherlands, 9 from Germany, 8 from Greece, 6 from Cyprus and 4 from France and UK. Nobody from Poland mentioned this use case.

Autonomous employee transportation was reported by 4 participants from France, 3 from Germany and UK, 2 from Spain and Poland and 1 participant from the Netherlands. Nobody from Cyprus or Greece mentioned this use case.

Autonomous pod to hospital was reported by 5 participants from UK, 4 from Spain, 3 from Poland, 2 from France and 1 participant from Cyprus, Germany and Greece. Nobody from the Netherlands mentioned this use case.

Platooning pod was reported by 4 participants from UK, 3 from Germany and 1 participant from France and Greece. Nobody from Cyprus, Spain or the Netherlands mentioned this use case.

Private pod was reported by 7 participants from UK, 6 from Germany and Spain, 5 from Greece, 2 from France and 1 participant from Cyprus. Nobody from the Netherlands or Poland mentioned this use case.

Individual pods such as 3 or 4 wheel vehicles were reported by 3 participants from UK, 2 from Cyprus and 1 participant from Spain and the Netherlands. Nobody from Germany, France, Greece or Poland mentioned this use case.

Scheduled bus or shuttle were reported by 20 participants from Germany, 19 from UK, 7 from Spain, 4 from Cyprus, France and Greece and 1 participant from Poland. Nobody from the Netherlands mentioned this use case.

Cable car was reported by 2 participants from UK and 1 from Poland. No one from other countries mentioned this use case.

On the other hand, the average relevance concerning use cases identified for transport freights (Figure 17) concludes that the most frequently freight transport use cases were delivery drones (35% of participants across all countries), followed by delivery robots by land (30%) and last mile delivery vans (19%).

Trucks have been also suggested as autonomous vehicles in different ways, as individual autonomous trucks (10%) and as platooning trucks (3%).

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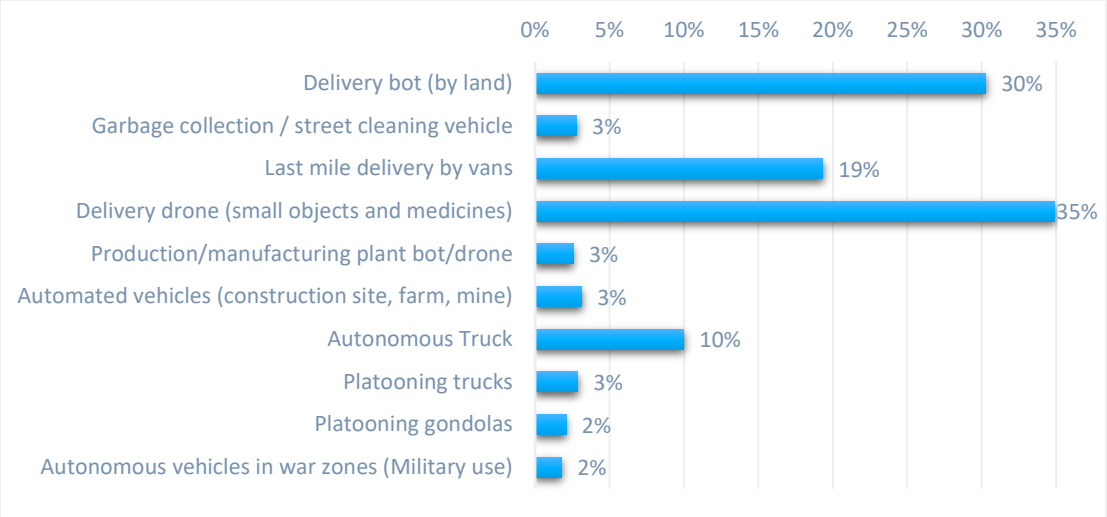

Figure 17. Types of AVs for transport freights proposed by citizens and organizations

Following Figure 18 shows the relevance per country. The values represent how many participants reported each use case per country.

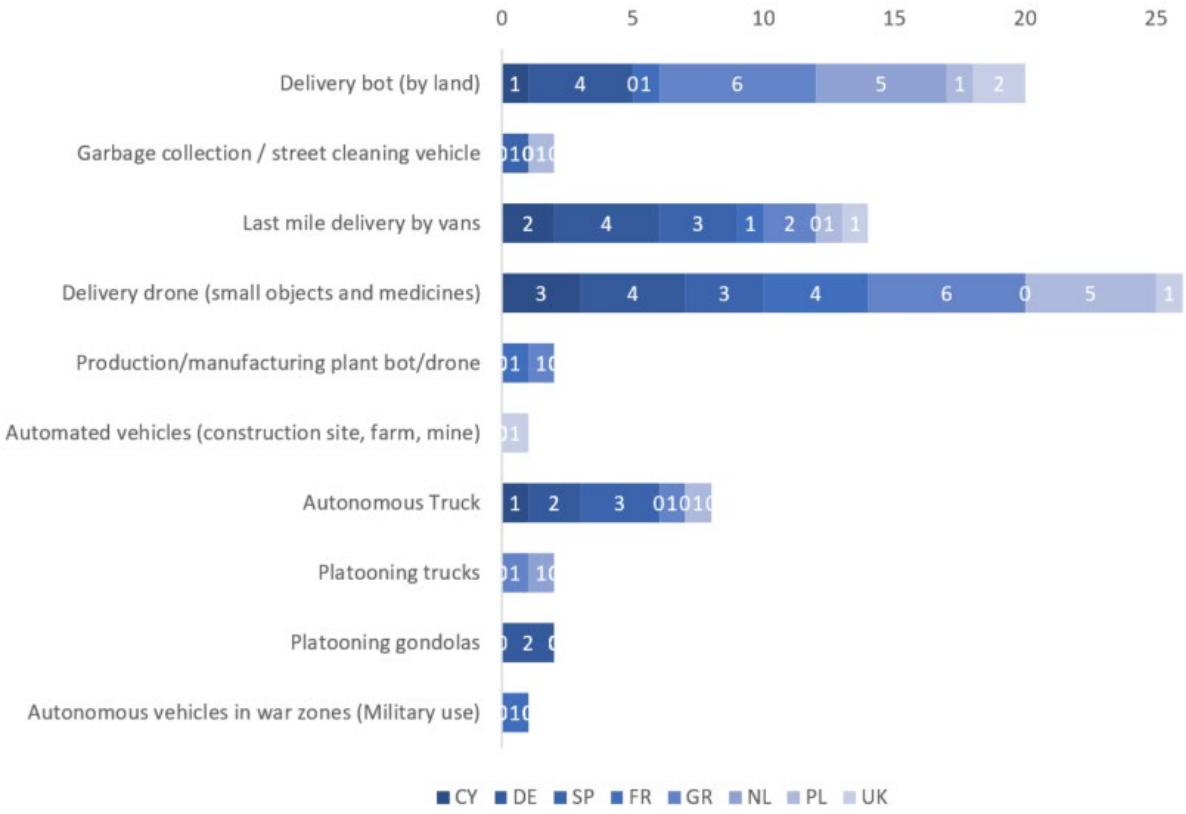

Figure 18. Relevance of AVs for transport freights reported by citizens and organizations

Per country, the following conclusions have been found according to relevance of each use case:

Delivery bot (by land) was reported by 6 participants from Greece, 5 from the Netherlands, 4 from Germany, 2 from UK and 1 participant from Cyprus, France and Poland. Nobody from Spain mentioned this use case.

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Garbage collection and/or street cleaning vehicle were reported only by 1 participant from Spain and another from Poland.

Las mile delivery by vans was reported by 4 participants from Germany, 3 from Spain, 2 from Cyprus and Greece and 1 participant from France, Poland and UK. Nobody from the Netherlands mentioned this use case.

Delivery drone for small objects and medicines was reported by 6 participants from Greece, 5 from Poland, 4 from Germany and France, 3 from Cyprus and Spain and 1 participant from UK. Nobody from the Netherlands mentioned this use case.

Production and/or manufacturing plant robot or drone were reported only by 1 participant from France and another from Greece.

Automated farm vehicles like diggers for farmers, miners, etc… were reported only by 1 participant from UK.

Autonomous truck was reported by 3 participants from Spain, 2 from Germany and 1 participant from Cyprus, Greece and Poland. Nobody from France, the Netherlands or UK mentioned this use case.

Platooning trucks was reported only by 1 participant from Greece and another from the Netherlands.

Platooning gondolas was reported just by 2 participants from Germany.

Autonomous vehicles for supplies in war zones (military use) was reported only by 1 participant from Germany.

Conclusion: In general, commonly known vehicles are mostly reported whereas new vehicles are less mentioned, probably due to lack of knowledge. Buses and shuttle use cases were the most reported in Germany and United Kingdom and Demand Responsive Transport Buses from rural or suburban to mobility hub has been widely mentioned in Spain and Poland. The perception of autonomous vehicles is mainly associated to shared mobility systems.

Concerning freight transport, small vehicles such as delivery bots by land and drones by air are the main use cases reported while autonomous trucks has been mentioned mainly in Spain.

2.3.2.2 Use cases findings: comparison among citizens profiles

This section shows a qualitative analysis of the reported use cases based on the characteristics of the different groups of citizens who have reported each use case.

The characteristics that have been considered are: age, gender, origin, and mobility difficulties. According to each one of these, the analysis shows the relevance of the use cases taking into account that relevance describes the most reported type of use cases.

The conclusions reported in this analysis are limited since the database is the result of co-creation activities in different countries. During these activities, each participant provided information such as their age, the gender with which they identify, the place where they live –city, town, village- and if they find difficulties to move around, specially related to having driver's license or having a long-term illness, health problem, disability or impairment that affects their daily life. It also includes to carer of someone who has a long-term illness, health problem, disability or impairment that affects their daily life.

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The data provided by co-creation activities in Greece, the Netherlands and Poland do not allow differentiating between age, gender, origin, and mobility difficulties.

Relevance of use cases according to age:

Participants with an age between 18 and 34 years reported buses and pods as the use cases with the most relevance in Cyprus, Germany, Greece, Spain, France and United Kingdom. Moreover, participants from Greece reported delivery bots and drones as one of the use cases with the most relevance.

On the other hand, participants with an age between 35 and 64 years reported buses as the use cases with the most relevance in Cyprus, Germany, Greece, Spain, France and United Kingdom. Moreover, pods where reported in Germany, Greece, Spain and United Kingdom.

Finally, participants who are 65 years old or more reported buses and pods as the use cases with the most relevance in Cyprus, Germany, Greece, Spain, France and United Kingdom. Moreover, trucks were reported by Spanish participants.

Relevance of use cases according to gender:

According to gender, there are no significant differences between participants that describe themselves as male or as female. Both reported shuttles, buses and pods as passenger transport use cases and delivery bots and drones as freight use cases with the most relevance in Cyprus, Germany, Greece, Spain, France and United Kingdom.

If any difference needs to be reported, it could be that taxis and specific use cases were reported by male participants more than by female participants.

Relevance of use cases according to origin:

Participants living in small towns or suburban areas and villages mainly reported buses, taxis and pods as the use cases with the most relevance in Cyprus, Germany, Greece, Spain, France and United Kingdom, whereas participants living in cities reported a huge variety of different use cases.

Delivery by drones was also reported significantly by participants from rural areas such as villages with less than 2000 people.

Relevance of use cases according to mobility difficulties:

Participants having a long-term illness, health problem, disability or impairment that affects their daily life, including to carer of someone who has a long-term illness, health problem, disability or impairment that affects their daily life and participants not having a driver's license or not able to drive a vehicle have mainly reported buses and taxis as the use cases with the most relevance in Cyprus, Germany, Greece, Spain, France and United Kingdom, whereas pods or private cars were reported by participants from Germany, Spain and France.

Conclusion: Buses and pods have been the most reported use cases and scenarios regardless of the age or gender of the participants. However, the origin of the participants has been decisive: participants living in small towns or suburban areas and villages mainly reported buses, taxis and pods as the use cases with the most relevance whereas participants living in cities reported a huge variety of different use cases. On the other hand, participants having health problems, disability or impairment that affects their daily life, including to carer of someone, and those who not have a driver's license mostly reported buses and taxis.

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2.3.3 Use cases and scenarios identified in co-creation activities and analysed through process 2

Table 13 below lists the uses cases and scenarios co-created by participants of activity 1 and 2 in all the events carried out across the 8 countries, after the application of the process 2.

Table 13. Use cases and associated scenarios suggested by partners

Transport sector	Use cases / Scenarios
Passenger transport	• Autonomous car / pods (personal / sharing) • Taxi / Autonomous e-hailing • Autonomous (mini) bus (within the city, to train station, from rural /areas with low population density to city centre, to supermarkets, hospital, airport, zoo, cemeteries) • City scheduled route with flexible stops. • Bus for passengers and freights • On demand vehicle for mobility-restricted users and disabled people (i.e. seniors/disabled/patient/kid) • Ambulance for patients in rehabilitation • On-site Hospital transportation • 4-wheel electric mobility scooter • Autonomous Cable Cars • Platooning
Freight transport	• Delivery vans • Garbage collection / street cleaning vehicle • Long distances freight trucks • Autonomous streetcar with bike/baggage transport • Delivery bot (food, groceries, small packages, medicines) • Drone for delivery medicines, homecare delivery, organs, samples for search, • Intra manufacturing plant delivery pods • Robot for picking fruits dropped on the floor

The following tables show the selection of scenarios made from each partner according to the most relevant use cases and scenarios reported per country by participants in activities 1 and 2. The selection was made by own criteria of the partners in charge of the analysis e.g. most frequent use case mentioned, market potential at country level, capacity to cover the needs of vulnerable groups, etc. Each use case is represented a specific scenario and identifies the main features that define them.

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Table 14. Scenarios for passenger in Cyprus

	CY_p1	CY_p2	CY_p3
Scenario name	autonomous cars	autonomous taxis/pods	autonomous buses
Individual/family or collective use	individual/family	collective	collective
Ownership	private	transportation network companies (TNC)	TNC or part of public transportation fleet
Locations served	anywhere	anywhere	urban areas
Distances covered	short-medium-long	short-medium (taxi service)	short-medium (door-to-door service)
Type of service	always available (private)	scheduled; online payment	specific service hours; online payment
Vehicle type	private vehicles	private vehicles	mini-bus, shuttle-bus
Vehicle size	4-5 people	3-4 passengers	up to 10 passengers
'Comfort": Vehicle inside (space and seat configuration)	ample leg-room; extra space for shopping bags	ample leg-room; extra space for shopping bags	ample space for mobility-impaired people
Provision for people with mobility restrictions	space for mobility aids	space for mobility aids	ramps for boarding/alighting
Energy	electric, ICEVs	electric	electric
Main users	anyone; people with disabilities or mobility-impaired	anyone; people with mobility problems; elderly; people who do not own a vehicle; tourists	anyone; people without any other means of transportation; children; elderly
Trip purpose	shopping/doctor's appointment	any trip purpose; doctor's appointment; deliver groceries/medicines; from/to airport	any trip purpose; medical appointments; school trips
Frequency	always available (private)	on demand	on demand (door-to-door service)
Parking	residence, off-site parking locations	service always running	bus stops (<1 min); bus depot (long duration parking)
Time of day	any time (private)	as needed	scheduled
Surveillance	CCTV	human attendant inside	human attendant inside
Maintenance service			
Payment			
Services			
Escort	cheaper than ICEV	cheaper than traditional taxis	more expensive than traditional bus service; free service for certain groups
Price	N/A	Yes	Yes
Subscription service			

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Table 15. Scenarios for freight in Cyprus

	CY_f1	CY_f2
Scenario name	delivery drones	delivery trucks/pods
Air vs land	air	land
Type of vehicle	flying drones	autonomous trucks
Type of area	urban	urban - rural
Used by single company or collective use	collective	collective
Ownership	owned by delivery companies	owned by delivery companies
Locations served	CBD in urban areas	urban - rural (during off-peak hours)
Coverage	within a city	one or multiple regions
Distances covered	short	medium - long
Type of service	on demand	on demand
Vehicle size	small	medium duty or heavy-duty trucks
Type of products delivered	products/goods	goods
Main users (senders)	companies	companies
Main users (receivers)	individuals in CBD areas	organizations
Frequency	on demand	on demand (off-peak hours)
Time of day	as needed	off-peak; evening
Maintenance service		
Payment		

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Table 16. Scenarios for passenger in Germany

	DE_p1	DE_p2	DE_p3
Scenario name	Autonomous Cable Cars	Autonomous e-hailing	Autonomous Shuttle bus to train station
Individual/family or collective use	Collective	Individual	Collective
Ownership	Public	Service	Public
Locations served	Transportation across the city	Anywhere up to 10km, depending on service coverage	Suburbs and rural areas to closest train station
Distances covered	Medium to long (1 - 3km)	Depending on service coverage	up to 5km to main train/bus station
Type of service	On-Demand	On-Demand	On-Demand
Vehicle type	Cable Car	AV electric car	AV Shuttle Bus
Vehicle size	Medium (10 -15 passengers)	Small (4 passengers)	Medium (10-15 passengers)
'Comfort": Vehicle inside (space and seat configuration)	Extra space for cargo	Extra space for luggage	Space for wheelchairs and baby carts
Provision for people with mobility restrictions		Integrated ramp for wheelchair	Integrated ramp for wheelchair
Energy	Electric	Electric	Electric
Main users	Tourists, older people, and mobility impaired people	All citizens	All citizens
Trip purpose	Commuting, and leisure	Door-to-door transportation	Commuting and leisure
Frequency	During the day	Always available	Very regular (every 10 to 15 minutes)
Parking	Parking space available at cable car stations	No parking needed	service always running during the day
Time of day	Day-time	Anytime	any time
Surveillance	CCTV	CCTV	CCTV
Maintenance service			
Payment			
Services			
Escort			
Price			
Subscription service			

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Table 17. Scenarios for freight in Germany

	DE_f1	DE_f2	DE_f3
Scenario name	Autonomous food/groceries delivery bots	Drone medicine delivery	Delivery vans in train
Air vs land	Land	Air	Land
Type of vehicle	Autonomous bot	Autonomous Drone	Autonomous delivery van and RoRo train
Type of area	Rural	Suburbs and rural areas	Regional
Used by single company or collective use	Single company	Single company	Collective by delivery companies
Ownership	Owned by single delivery company	Owned by pharmacies	Service for delivery companies
Locations served	All locations within the town	All locations within the town	Delivery stations in main cities
Coverage	Town	Town	A region
Distances covered	Short (range of 5 km)	Short (range of 5km)	Long (above 50km)
Type of service	On demand	On demand	Hauling of AV Delivery Vans
Vehicle size	Very small	Very Small	Medium to Large
Type of products delivered	Groceries, food, and convenience items	Medicines	Packages
Main users (senders)	Supermarkets, stores, and restaurants	Pharmacies and Hospitals	Haulage companies and train companies
Main users (receivers)	Individuals	Individuals with impaired mobility	Haulage companies
Frequency	On demand	On demand	Daily
Time of day	As needed	As needed	As needed
Maintenance service			
Payment			

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Table 18. Scenarios for passenger in Spain

	SP_p1	SP_p2	SP_p3	SP_p4	SP_p5
Scenario name	Mixed Bus Passengers – Freights	City scheduled route with flexible stops. Mini-van sharing	Uni-personal pod Sharing	Ambulance for patients in rehabilitation	4-wheel electric mobility scooter
Individual/family or collective use	Collective	Collective	Individual	Individual	Individual
Ownership	Provided by public administration	Outsourced private service	Provided by private company	Outsourced private service	Provided by private company
Locations served	Scheduled route	Anywhere along the scheduled route	Anywhere up to 10 km	Hospital, health centres, rehabilitation clinic, sports medicine	Anywhere up to 5km
Distances covered	Long, between rural and urban areas	Routes from 5 to 15 km	Up to 10 km	Short distances (inside cities and nearby towns)	Up to 5km
Type of service	scheduled	Scheduled frequency every 15'	On demand	On demand	On demand
Vehicle type	Bus	Mini-van	pod	Ambulance	4-wheel scooter
Vehicle size	Large (50 passengers)	Small (4 – 6 passengers)	Small (1 passenger)	Small (2-4 passengers)	Small (1 passenger)
'Comfort": Vehicle inside (space and seat configuration)	Extra space for packaging and other goods	Extra space for shopping bags	Extra space for working or shopping bags	Space for medical equipment	Extra space for shopping bags
Provision for people with mobility restrictions	Adapted bus	Space for wheelchairs and mobility aids	1 each 10 pod is adapted. Selected by call	Adapted ambulance. Space for wheelchairs/mobility aids	Adapted
Energy	Hydrogen	Electric	Electric	Electric	Electric
Main users	All ages from rural areas. Adapted also for persons with disabilities	All ages, inside the city and town	All ages, inside the city	Patients and their support persons or families	Older people or people with reduced mobility
Trip purpose	Shopping, leisure and health centres	All types: working, shopping, leisure…	All types: working, shopping, leisure…	Medical treatment	Shopping or leisure
Frequency	Scheduled	24/7, scheduled by local administration. Ideally every 15'	Always available	On demand, during the day	On demand, during the day
Parking	Bus station	Don´t need park, only stops for raising and lowering passengers	Pod-only parking spaces in city centre and shopping/leisure areas	Hospital or health centres	Pod-only parking spaces in city centre and shopping/leisure areas
Time of day	Day-time during the week +Night-time on weekends	All day	All day	Day-time	Day-time
Surveillance	Cabin crew	CCTV and GPS system	CCTV and GPS system	Human attendant inside	CCTV and GPS system
Maintenance service	Provided by private company	Outsourced private service	Provided by private company	Outsourced private service	Provided by private company
Payment	Cash, credit card, travel card, app, pass	Credit card, app. Travel card, cash, subscription	Credit card, app, subscription	Free for users, paid by local administration	Credit card, app, subscription
Services					
Escort					
Price					
Subscription service					

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Table 19. Scenario for freight in Spain

	SP_f1	SP_f2	SP_f3	SP_f4	SP_f5
Scenario name	Garbage collection / street cleaning vehicle	Last mile delivery by vans	Long distances freight trucks	Drones for medicine delivery	Robot for picking fruits dropped on the floor
Air vs land	Land	Land	Land	Air	Land
Type of vehicle	Autonomous electrical truck	Electrical van	Hydrogen truck	Drones	Electrical
Type of area	Urban	Urban	Long distances	Rural areas or geographically isolated areas	Rural
Used by single company or collective use	Collective use	Collective use	Single company	Collective use	Single company
Ownership	Owned by local administration	Owned by single delivery company	Owned by private company	Owned by local administration	Owned by private company
Locations served	Scheduled routes within the city	All locations within the city	All over the country	remote parts of a region	Rural areas
Coverage	A city and a town	A city or a village	Country	A region	Farmlands
Distances covered	Routes from 15 to 30 km within the city	Up to 5 km	Long distances	Short/medium	Medium
Type of service	Scheduled by local administration.	On demand	On demand	On demand	On demand
Vehicle size	Large	Small van	Large	Small	Medium
Type of products delivered	Garbage and water	Fragile items	Freights	Medicines or goods to be delivered with urgency	Fruits
Main users (senders)	Staff from local administration	Individuals or organizations	Companies	pharmacies, hospitals	Farmers
Main users (receivers)	Staff from recycling plant	Individuals or organizations	Companies	individuals in isolated areas and with mobility restrictions	Farmers
Frequency	Every day	On demand	every day on demand	On demand	On demand
Time of day	Night-time	Day-time	As needed	As needed	As needed
Maintenance service	Outsourced private service	Provided by private company	Provided by private company	Provided by private company	Provided by private company
Payment	Free for users, paid by local administration	Credit card, app	Company expenses	Credit card, app	Company expenses

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Table 20. Scenarios for passenger in France

	FR_p1	FR_p2	FR_p3	FR_p4
Scenario name	Seniors/Disabled/Patient/Kids Transportation	Rural to urban Shuttle/Bus	Residential taxi/pods	On-site Hospital transportation
Individual/family or collective use	Individual/Collective	Collective	Individual	Individual/Collective
Ownership	Home/Healthcare operators	Regional Public Transport	Local Administration	Hospital
Locations served	Home to Care/Services/Shopping centers	Cities	Cities	On campus
Distances covered	10Km to 50Km	10Km to 50Km	10Km around Home or Care Residence	<2Km
Type of service	Scheduled	Scheduled	always available or scheduled	Scheduled
Vehicle type	Bus/Pods/Cars	Bus/Shuttle/Convoy Pods	Cars/Pods	Shuttle/Pods/Cars
Vehicle size	Medium/Small	Medium	Small	Medium/Small
'Comfort": Vehicle inside (space and seat configuration)	Extra space shopping bags	Extra space shopping bags & Bikes	Space for bags	Extra space for equipement
Provision for people with mobility restrictions	Space for wheelchairs/mobility aids	Space for wheelchairs/mobility aids	Space for wheelchairs/mobility aids	Space for mobility aids
Energy	Electric	Electric	Electric	Electric
Main users	People not autonomous (Senior, Kids, Disabled, Patients)	All citizens	People not autonomous (Senior, Kids, Disabled, Patients)	Patient/Medical staff/Helpers/Admins
Trip purpose	Service, care, leisure or shopping	Work, Leisure, Study, Shopping, Services, Tourism	Services/Care/Social activities/Leisure/Sport	Healthcare
Frequency	2 morning and 2 afternoon	Regular	Can be ordered or scheduled	Regular or On demand
Parking	N/A	At access points	N/A	Hospital Parking
Time of day	Day-time	Day-time	Day-time	As needed
Surveillance	Vidéo	Vidéo	Vidéo	Vidéo
Maintenance service				
Payment				
Services	Emergency Services		Emergency Services	Emergency Services
Escort	Volunteers or Civic workers			
Price				
Subscription service				

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Table 21. Scenarios for freight in France

	FR_f1	FR_f2
Scenario name	Homecare delivery drones	Intra manufacturing plant delivery pods
Air vs land	Air	land
Type of vehicle	Drones	Autonomous delivery robots
Type of area	Rural	Production plants
Used by single company or collective use	Collective use	Used by manufacturing company
Ownership	Homecare operators	Manufacturing company
Locations served	Rural or Remote geographies	Intra manufacturing plant
Coverage	10-30KM around service points (Homecare/Healthcare)	Storage to production stations
Distances covered	Short/Medium	<1Km
Type of service	On demand	Scheduled or On demand
Vehicle size	Small	Small/Medium depending on Parts transported
Type of products delivered	Food/Medicin/Care products	Parts or Industrial production
Main users (senders)	Homecare	Logistics
Main users (receivers)	Senior/Disabled/Patients	Production operator
Frequency	When needed	On demand or scheduled
Time of day	As needed	As needed
Maintenance service		
Payment		

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Table 22. Scenarios for passenger in Greece

	GR_p1	GR_p2	GR_p3
Scenario name	GR_cit_14	GR_cit_24	GR_org_1
Individual/family or collective use	collective	individual	collective
Ownership	public	private	private
Locations served	within the city	anywhere around Lesvos	n/a
Distances covered	short	long	n/a
Type of service	scheduled	on demand	n/a
Vehicle type	autonomous bus	drone	taxi pod
Vehicle size	n/a	n/a	small
'Comfort": Vehicle inside (space and seat configuration)	n/a	n/a	n/a
Provision for people with mobility restrictions	ramps	n/a	n/a
Energy	n/a	n/a	n/a
Main users	n/a	private courier companies, people with mobility problems, people that are in a case of emergency	citizens
Trip purpose	transport of workers & citizens		transport
Frequency	regular	daily	daily
Parking	n/a	special drone areas	n/a
Time of day	day time	24/7	n/a
Surveillance	human	n/a	n/a
Maintenance service			
Payment			
Services			
Escort			
Price			
Subscription service			

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Table 23. Scenarios for freight in Greece

	GR_f1	GR_f2
Scenario name	GR_org_10	GR_cit_5
Air vs land	n/a	collective use
Type of vehicle	delivery bot/drone	within the village/rural area
Type of area	n/a	rural
Used by single company or collective use	collective use	collective use
Ownership	private	government
Locations served	all locations of the city especially hospitals	
Coverage	city	a village
Distances covered	medium up to 40km	short/within the village
Type of service	on demand	on demand
Vehicle size	n/a	small
Type of products delivered	It will be used for the delivery of small parcels, documents, medical material inside a hospital, or for the delivery of food and beverages in close destinations of small distance.	medicine
Main users (senders)	delivery companies/courier, employees from the public sector, medical staff, restaurants/cafes, etc	Municipality of Western Lesvos
Main users (receivers)	individuals or organizations	individuals with special needs/mobility issues
Frequency	on demand	on demand
Time of day	24/7 all week	n/a
Maintenance service		
Payment		

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Table 24. Scenarios for passenger in the Netherlands

	NL_p1	NL_p2	NL_p3	NL_p4
Scenario name	Mini-Bus	Mini-Bus for mobility-restricted users and disabled people	Autonomous Pod	Taxi
Individual/family or collective use	Collective use	Collective use	Individual/Family	Individual or shared use
Ownership	Public Organization	Public Organization	Private	Private Organization
Locations served	Hub to work / home	Door to door	Door to door	Door to door
Distances covered	<3 km	Short and medium, up to 15 km	All distances, including long travels	Short and medium, up to 15 km
Type of service	Scheduled	Always available (collective)	Shared vehicle, privately owned	Individual or shared use
Vehicle type	Mini Bus	Mini Bus	Pod, possibility to platooning	Car
Vehicle size	Medium to large, 9-20 persons. Less spaces when wheelchair gets in.	Medium, Max. 12 people	Small, 2-4 passengers	Small, 2-4 passengers
'Comfort": Vehicle inside (space and seat configuration)	Easy to get in and out, at least 2 entrances.	Easy to get in and out	Good view	enough leg space, noise cancelling, place to work
Provision for people with mobility restrictions	Space for wheelchair	Space for multiple wheelchairs	N/A	N/A
Energy	Electric	Electric, Charged during travel	Electric (one use case mentioned Hydrogen)	Electric
Main users	Commuters	Elderly and people with a disability	individuals/families	individuals/families
Trip purpose	N/A	N/A	N/A	N/A
Frequency	Regular	Always available	Always available, but shared use	Always available
Parking	N/A	N/A	Designated parking spaces, like valet parking	N/A
Time of day	day-time	day-time	any time	any time
Surveillance	Direct contact possible with emergency services	Direct contact possible with emergency services	N/A	N/A
Maintenance service				
Payment				
Services				
Escort				
Price				
Subscription service				

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Table 25. Scenarios for freight in the Netherlands

	NL_f1
Scenario name	Delivery Bot
Air vs land	Land
Type of vehicle	Autonomous Bot
Type of area	Urban
Used by single company or collective use	Collective Use
Ownership	Single delivery company
Locations served	All locations within the city
Coverage	City
Distances covered	Short
Type of service	Regular
Vehicle size	Very small
Type of products delivered	Small Packages, possibilities for medicines
Main users (senders)	Organisations
Main users (receivers)	Individuals
Frequency	3 times per day
Time of day	Morning, midday, evening
Maintenance service	
Payment	

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Table 26. Scenarios for passengers in Poland

	PL_p1	PL_p2	PL_p3	PL_p4
Scenario name	wheeled transport of patients	transport of child, pet, emergency	Autonomous minibus. Last mile transport	autonomous passenger transport in areas excluded from the public:
Individual/family or collective use	individual	individual	collective	collective
Ownership	public	private	public/private	private
Locations served	between hospitals	anywhere up to 50 km	to transfer centers, areas with low population density	supermarkets, airport zoo, cemeteries
Distances covered	within Metropolia	within Metropolia	up to 200 km	up to 10 km - closed areas
Type of service	on demand	on demand	scheduled/on demand	scheduled/on demand
Vehicle type	mini-bus/pod	pod	mini-bus	mini-bus/pod
Vehicle size	small (3 passengers)	small (2 passengers)	10-20 passengers	small/medium
'Comfort": Vehicle inside (space and seat configuration)	medical equipment	N/A	space for baggage	space for baggage
Provision for people with mobility restrictions	space for wheelchairs/mobility aids	space for wheelchairs/mobility aids	N/A	space for wheelchairs/mobility aids
Energy	electric	electric	electric	electric
Main users	patients	adults, children, pets	citizens	citizens
Trip purpose	medical examination	N/A	daily travel	daily travel
Frequency	on demand	on demand	on demand	scheduled/on demand
Parking				
Time of day	on demand	on demand	on demand	
Surveillance	human attendant inside	N/A	N/A	N/A
Maintenance service				
Payment				
Services				
Escort				
Price				
Subscription service				

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Table 27. Scenarios for freight in Poland

	PL_f1	PL_f2	PL_f3
Scenario name	drones for medicine delivery	A drone to deliver drugs ordered online (e-prescription)	Autonomous streetcar with bike/baggage transport
Air vs land	air	air	land/rail
Type of vehicle	drones for medicine delivery	drones for medicine delivery	autonomous streetcar
Type of area	urban/rural	urban/rural	city centre
Used by single company or collective use	individual	individual	collective
Ownership	private/public	private/public	private/public
Locations served	all locations - between hospitals	door-to door	on planned root
Coverage	urban, suburban, rural	urban, suburban, rural	urban
Distances covered	short/medium	short/medium	medium/long
Type of service	on demand	on demand	scheduled
Vehicle size	medium	small	large
Type of products delivered	drugs, organs, samples for research	drugs	bicycles/baggage (with passengers on board)
Main users (senders)	hospitals	pharmacies	citizens
Main users (receivers)	hospitals/laboratories	citizens, elderly, disabled	citizens
Frequency	on demand	on demand	scheduled
Time of day	as needed	evening/as needed	all day
Maintenance service			
Payment			

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Table 28. Scenarios for passenger in United Kingdom

	UK_p1	UK_p2	UK_p3	UK_p4
Scenario name	autonomous bus	Hospital pod	City pods	Platooning pod that splits into different directions
Individual/family or collective use	Collective	Collective	Individual	Collective
Ownership	Public	Not mentioned (but most likely public)	Private/or rented when needed	Public
Locations served	Local area, less than two-hour journeys, connecting towns and rural areas to train stations and bigger cities	Hospitals and within local areas	Within a city like London	Within a city like London and commuter belt
Distances covered	Relatively short/medium distances, up to two-hour drive	Not mentioned (but most likely relatively short)	Relatively short	Medium distances
Type of service	Scheduled but with more routes and stops than current services	Not mentioned	Always available (private)	Scheduled and like ride haling
Vehicle type	Bus	Pod	Pod	Platooning pod
Vehicle size	Similar to current UK local buses (approx. 40 passengers)	Small 2-3 passengers - safer for clinically vulnerable people	Small (1-2 passengers)	Large (but splitting into smaller autonomous pods)
'Comfort": Vehicle inside (space and seat configuration)	Not mentioned	Would be frequently sanitised (in between uses)	high connectivity e.g. chargers, Bluetooth etc	people more separated by the pods /in the pods to prevent crowding
Provision for people with mobility restrictions	yes particularly elderly with mobility issues and less likely to be able to drive themselves	Person to help/assist people with mobility issues	Not mentioned but it would be accessible to people with mobility issues, particularly those who cannot drive because of an impairment	It would be accessible to those with mobility issues
Energy	Not mentioned	Not mentioned	Not mentioned	Electric
Main users	People from areas that are less well connected, elderly, people without a driving license, people travelling at less sociable hours e.g. airport or returning from night out	Patients/clinically vulnerable, people who want to visit the hospital	Older people, parents, people with mobility issues, commuters/people who struggle to navigate city public transport	Older people, commuters, those who travel frequently, those with mobility issues
Trip purpose	Wide range of purposes but could particularly alleviate non-drivers reliance on taxis for short journeys in rural areas	Health reasons, scans/tests	All kinds of purposes (similar to private car use)	Wide range of purposes but particularly commuting
Frequency	Regular and 24 hours, with more frequent and reliable routes than current public transport by bus in certain areas	On demand	Always available (private) or rentable through an app to call upon at anytime	Regular, daily, frequency depending on demand of each area
Parking	Service will be constantly running	Not mentioned	Specific allocated parking spots. Current parking capacity could be reduced due to the smaller size of the pods	Not mentioned
Time of day	24 hour	On demand	Any time (private)	Not mentioned
Surveillance	Not mentioned	Human attendant inside	Not mentioned	Not mentioned
Maintenance service				
Payment	Payment through card on the bus, low fares, with some sort of gate/barrier to prevent fare evasion	card in the pod or pre-booked via online or telephone/hospital. Potentially free to patients and paid for by the council through advertising in the pod	privately owned or rented anytime paid for through an app	Online or contactless payment
Services				
Escort				
Price				
Subscription service				

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Table 29. Scenarios for freight in United Kingdom

	UK_f1
Scenario name	Consolidated delivery services
Air vs land	Land
Type of vehicle	Vans
Type of area	Any, including rural
Used by single company or collective use	Collective use by different companies
Ownership	Owned by one company who would manage it
Locations served	Across the UK
Coverage	Country-wide, door to door
Distances covered	Not mentioned
Type of service	On demand
Vehicle size	Medium/large
Type of products delivered	All kinds of deliveries product deliveries, including food, groceries, small items, medicine
Main users (senders)	Companies delivering goods (amazon, groceries, UPS, dominos), pharmacies, retailers (e.g. Tesco's)
Main users (receivers)	Individuals particularly those with mobility issues/isolated etc
Frequency	On demand
Time of day	As needed
Maintenance service	
Payment	

2.3.4 Comparison with uses cases and scenarios found in literature and reported in D1.1

The CCAM solutions identified in D1.1 is the result of a comprehensive review of the types of vehicles and services proposed in surveys and focus groups activities and reported in academic papers, reports and policy documents. As happen in the co-creation activities performed in MOVE2CCAM, the state of the art was focused in replicable solutions to be deployed in Europe in the short and medium timeline and could be deployed in most of European cities. Consequently, CCAM solutions consisted of vehicles and services to transport freight through land and air and transport passengers through land. On the other hand, bikes and trains were considered as outside of the scope of the project.

A comparison of the CCAM solutions identified in the state of the art and proposed by the co-creation activities performed in MOVE2CCAM allows to take the following conclusions:

- CCAM solutions identified in MOVE2CCAM and previous research activities consisted of existing types of vehicles, but they are proposed to be used in a collective mode by passengers and companies that have similar transport needs. Additionally, both have identified drones and robots that transport goods among different locations as possible CCAM solutions in the future.
- CCAM solutions proposed in co-creation activities performed in the project are aligned with the ideas identified in academic papers, reports and policy documents. Only some CCAM solutions identified in the literature were not proposed by participants from activity 1 and 2

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and these correspond with a shared use of autonomous freight vehicles by different companies.

- CCAM solutions identified by co-creation activities include more specifications not considered in the description done in the literature. These specifications include time of day in which the vehicle should run, locations served, energy source, vehicle inside features, etc.

Conclusion: The use cases reported by citizens and organizations involved in MOVE2CCAM project are aligned to the ideas identified in literature. In general, the scenarios defined through co-creation activities consisted of existing types of vehicles, and they are proposed to be used in a collective mode by passengers and companies that have similar transport needs. Moreover, co-creation activities have provided more specifications on the description of the scenarios that the findings from the literature.

2.4 Challenges, impacts and timeline of autonomous vehicles

The process followed for the analysis of the challenges, impacts and timeline of the deployment of CCAM solutions corresponds with process 1. It has been made on data sets obtained from the co-creation activities and its methodology is described in previous section.

2.4.1 Challenges

This section shows a synthesis of the challenges to be faced in the implementation of AVs in our society and which have been identified by organizations and citizens involved in the research. Eleven topics have been identified by the participants of co-creation activities, and these are described in detail in this section.

Figure 19 below presents the topics and the average relevance given by all the participants.

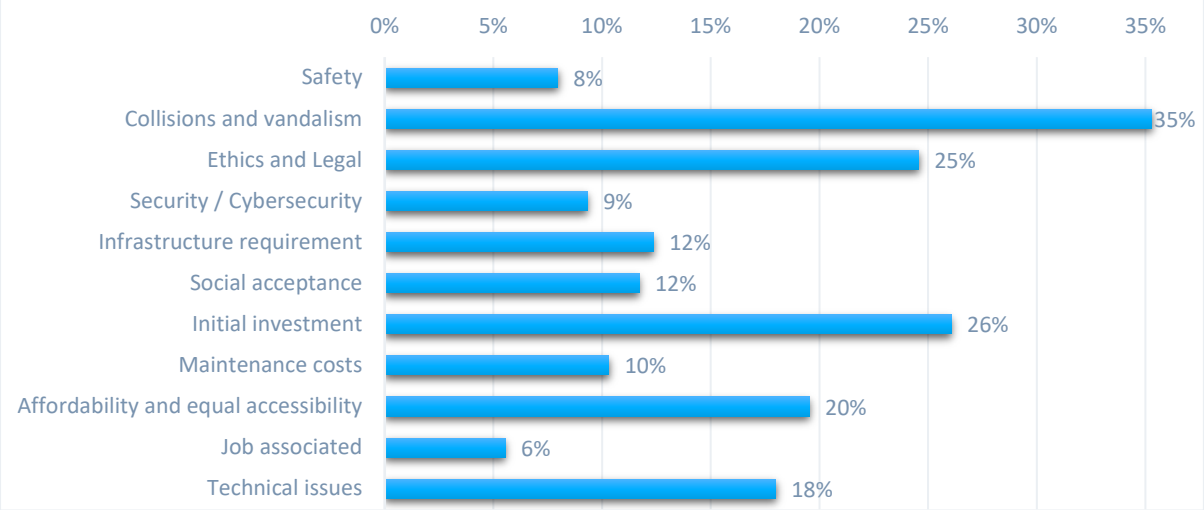

Figure 19. Average relevance of the challenges identified in the implementation of autonomous vehicles reported by all participants

Following Figure 20 shows the relevance per country. The values represents how many participants reported any question related to each challenge per country.

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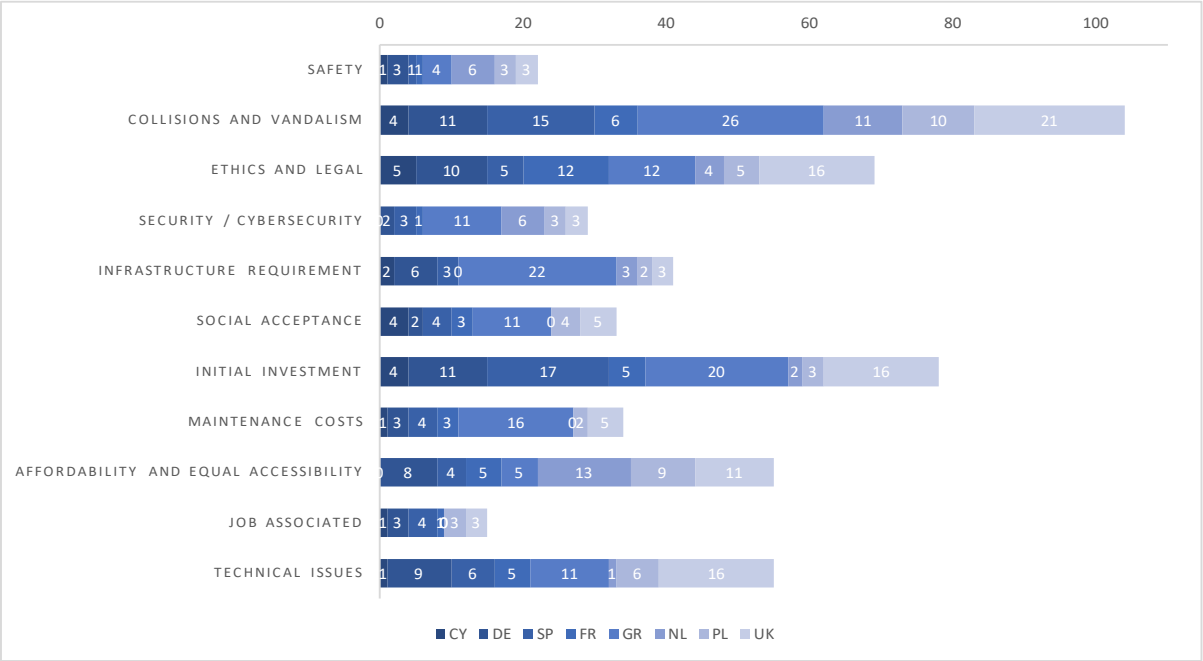

Figure 20. Relevance of the challenges identified in the implementation of autonomous vehicles reported by participants per country

Per country, the following conclusions have been found according to relevance of each topic:

Challenge 1: Safety

Participants described safety as one of the key aspects to face for the development of autonomous vehicles and refer this as the risk of vehicle users to suffer damages due to potential attacks to the vehicle or to the occupants (i.e. theft). A special reference was made to elderly people, children, persons with disabilities, women and immigrants as the most possible affected persons. Also, participants mentioned helpdesk and road assistance service as solutions to apply in case of a breakdown of the AV or to solve any need from the users.

The average relevance of this challenge shows that 8% of all participants involved in activities 1 and 2 mentioned any question related to safety. The relevance of this challenge indicates that was reported by 6 participants from the Netherlands, 4 from Greece, 3 from Germany, Poland and UK and 1 participant from Cyprus, Spain and France.

Challenge 2: Collisions and vandalism

This challenge is related to the collisions of the vehicle and the vandalism happening on AVs and how consequently the vehicle could be destroyed or theft and how users and non- users of AVs (i.e. others persons travelling or pedestrians) can be damaged. Additionally, under this category all the remarks from the participants on how the lack of staff can influence in the use of the vehicle without paying is included. Finally, the lack of hygiene inside the vehicle was occasionally mentioned along with other possible unintentional damages like the results of persons travelling when they are ill or intoxicated.

The average relevance of this challenge shows that 35% of all participants involved in activities 1 and 2 mentioned any question related to collisions and vandalism. The relevance of this challenge indicates that was reported by 26 participants from Greece, 21 from UK, 15 from Spain, 11 from Germany and the Netherlands, 10 from Poland, 6 from France and 4 participants from Cyprus, Spain and France.

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Challenge 3: Ethic and legal

Under this challenge category it is included all the concerns on how to determine the responsibility in case of accidents and who has to own the insurance. Also, participants wondering on what would the minimum age to use an autonomous car and how to handle and adapt legislation to define who can be considered as liable in case of accident and in what circumstances. Also, it was emphasised the requirement to solve ethic issues such as who to protect in case of a collision (vehicle user or person outside vehicle) and translate this to the mobility technology to develop. On the other hand, participants mentioned how the engineers who work in the car's technology should predetermine decisions on vehicles movements in order to protect vehicle user or other persons.

The average relevance of this challenge shows that 25% of all participants involved in activities 1 and 2 mentioned any question related to ethic and legal issues. The relevance of this challenge indicates that was reported by 16 participants from UK, 12 from France, and Greece, 10 from Germany, 5 from Cyprus, Spain and Poland and 4 from the Netherlands.

Challenge 4: Security / Cybersecurity

Participants raised concerns about privacy and security as how the AVs have the potential to collect sensitive data that can be used for surveillance purposes. Also, participants remarked how this type of vehicle can be hacked or suffered of cyber-attacks and how this can make the failure of the vehicle.

The average relevance of this challenge shows that 9% of all participants involved in activities 1 and 2 mentioned any question related to security and/or cybersecurity. The relevance of this challenge indicates that was reported by 11 participants from Greece, 6 from the Netherlands, 3 from Spain, Poland and UK, 2 from Germany and 1 participant from France. Nobody from Cyprus reported this impact.

Challenge 5: Infrastructure requirement

Participants highlighted the difficulty to face for AVs in many European cities due to their complex urban designs. Also, they remarked the restrictions of these vehicles to operate in the case they cannot perceive their environment reliably and when the required infrastructure is not developed. Participants also mentioned the need to assure in advance that the AVs can interact with road infrastructure and in special they can face normal events like animals running into the road, changing weather conditions and narrow lanes without marking. Additional comments were associated to the co-existence of autonomous vehicles with conventional vehicles and the need to develop proper infrastructure to reduce the perception of risk. It was perceived more risk under this situation than when the deployment of AVs is massive.

The average relevance of this challenge shows that 12% of all participants involved in activities 1 and 2 mentioned any question related to complex urban design of European cities, especially in old districts or related to interaction with road infrastructure. The relevance of this challenge indicates that was reported by 22 participants from Greece, 6 from Germany, 3 from Spain, the Netherlands and UK and 2 from Cyprus and Poland. Nobody from France reported this impact.

Challenge 6: Social acceptance

The challenge is related to the rejection of AVs by citizens and the reasoning behind. The low social acceptance was argued with the lack of trust on this type of vehicle or the lack of interest since the transport needs are covered with already existing services. As a consequence, private vehicles manufacturers and developers could not invest in them and municipalities could avoid their acquisition.

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The average relevance of this challenge shows that 12% of all participants involved in activities 1 and 2 mentioned any question related to social rejection by citizens to autonomous vehicles. The relevance of this challenge indicates that was reported by 11 participants from Greece, 5 from UK, 4 from Cyprus, Spain and Poland, 3 from France and 2 from Germany. Nobody from the Netherlands reported this impact.

Challenge 7: Initial investment

It was noted how most of the participants remarked the higher costs of this type of vehicle and the high initial investment in infrastructures and sensors required and how this can also affect to the costs of the transport service provided by AVs. Additionally, some participants mentioned the need to develop suitable business models to make this type of vehicle profitable for companies and affordable to the public sector and end-users.

The average relevance of this challenge shows that 26% of all participants involved in activities 1 and 2 mentioned high initial investment as a challenge. The relevance of this challenge indicates that was reported by 20 participants from Greece, 17 from Spain, 16 from UK, 11 from Germany, 5 from France, 4 from Cyprus, 3 from Poland and 2 from the Netherlands.

Challenge 8: Maintenance costs

Participants mentioned the reduction of maintenance costs related to the non-need of drivers to hire and the fact of being electrical vehicles. Despite, other participants remarked the high costs associated to the repairments due to the novelty of the technology.

The average relevance of this challenge shows that 10% of all participants involved in activities 1 and 2 mentioned any question related to maintenance costs. The relevance of this challenge indicates that was reported by 16 participants from Greece, 5 from UK, 4 from Spain, 3 from Germany and France, 2 from Poland and 1 participant from Cyprus. Nobody from the Netherlands reported this impact.

Challenge 9: Affordability and equal accessibility

Under this topic it is categorized all the comments related to how the high costs of the AVs can make than they are only affordable by people with high income and how this type of vehicle should be adapted for persons with reduced mobility.

On the other hand, few discussions among participants were about with which type of services should be the first to be covered with autonomous vehicles. People living in rural areas remarked how these should be implemented in these zones in order to cover the lack of transport services for vulnerable groups such as elder people who cannot drive and even to facilitate the transport of young people as alternative to fix the population of these areas. On the other hand, it was perceived how participants consider that the decision makers will select the urban areas to implement services with AVs due to the higher investment cost in rural areas as well as the reluctant of elder people to use this type of vehicle.

The average relevance of this challenge shows that 20% of all participants involved in activities 1 and 2 mentioned any question related to affordability and equal accessibility. The relevance of this challenge indicates that was reported by 13 participants from the Netherlands, 11 from UK, 9 from Poland, 8 from Germany, 5 from France and Greece and 4 from Spain. Nobody from Cyprus reported this impact.

Challenge 10: Job associated to autonomous vehicles

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It was detected the loss of jobs due to the deployment of AVs as another concern of participants. Some participants also mentioned that this type of vehicle can generate new job opportunities but this should be for technical and professional staff and assistants.

The average relevance of this challenge shows that 6% of all participants involved in activities 1 and 2 mentioned any question related to loss of jobs. The relevance of this challenge indicates that was reported by 4 participants from Spain, 3 from Germany, Poland and UK and 1 participant from Cyprus and France. Nobody from Greece or the Netherlands reported this impact.

Challenge 11: Technical issues

Technology failure, electronic equipment malfunctions, battery duration, GPS-location issues or internet connectivity loss were mentioned as problems to be faced when the AVs were in operation. Also, punctuality, frequency and the existence of enough number of vehicles and charging stations were functionalities requested by participants.

The average relevance of this challenge shows that 18% of all participants involved in activity 1 and activity 2 mentioned technical issues as a challenge. The relevance of this challenge indicates that was reported by 16 participants from UK, 11 from Greece, 9 from Germany, 6 from Spain and Poland and 1 participant from Cyprus and the Netherlands.

Conclusion: Participants from Spain, Greece, the Netherlands, Poland and United Kingdom reported more relevance about safety and cybersecurity challenges, whereas France and also United Kingdom participants consider ethics and legal responsibilities are really important challenges to be faced.

Participants from Spain, Greece and United Kingdom are the most worried about economic challenges, whether the relevance showed in Cyprus, Greece and the Netherlands concerns social aspects. Notice that Spain participants are particularly worried about the loss of jobs.

Finally, Greece and United Kingdom participants showed the most relevance about technical issues whereas participants from Poland are more worried about Safety.

2.4.2 Comparison with challenges for autonomous vehicles found in literature and reported in D1.1

It is important to compare data found in literature with data gathered from activity 1 and 2, in which citizens and organizations from 8 different countries participated.

The challenges found in literature were reported in MOVE2CCAM Deliverable 1.1 *CCAM solutions review and gaps* under the categories considered in Table 30 below.

Table 30: Categories in which challenges are described in D1.1

Economy	High costs of the autonomous vehicles (i.e. own vehicle), barriers for payment integration of shared solutions
Social	Defiance of citizens to use AVs due to lack of trust and concerns related to safety (collisions) and security (data privacy, hacking with malicious intentions) as well as lack of interest (non usefulness of AVs if other options exist)
Planning	Coexistence of autonomous vehicles with conventional vehicle in traffic and lack of infrastructure (ICT, road improvements, car parking space)
Technical	Scarce demonstrative projects, improvements required (e.g. cybersecurity, digital city mapping platforms)

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Market	Resistance of the mobility sector and other actors to change to new types of vehicles, uncooperative operators and lack of coordination between companies and competition from other services
Legal	Lack of regulation, regulatory barriers, ethics issues: who is responsible if something goes wrong (insurance cover, manufacturer, user)

Conclusion: The challenges reported by all participants involved in activities 1 and 2 are similar to those found in literature. The main concerns are related to collisions and vandalism, although ethics and legal issues, limitations because of high initial investment, technical issues and difficulties on making affordable CCAM solutions are also quite reported challenges.

It is remarkable that market acceptance aspects were not mentioned by participants in activities 1 and 2, firstly because citizens are not used to consider these aspects and secondly because organizations are open to this new opportunity.

2.4.3 Timeline implementation of CCAM solutions

This section shows conclusions obtained through co-creation activities about the perception that the participants have concerning the type of AVs that will be deployed for different time horizons (2025, 2030 and 2050). Participants know that there are already some autonomous vehicles operating in different countries; nevertheless, the approach in this activity is to analyse the level of deployment of CCAM solutions in the near future.

The following charts represent a detailed analysis showing differences in perceptions in the time horizon implementation of CCAM solutions between citizens and organizations at country level.

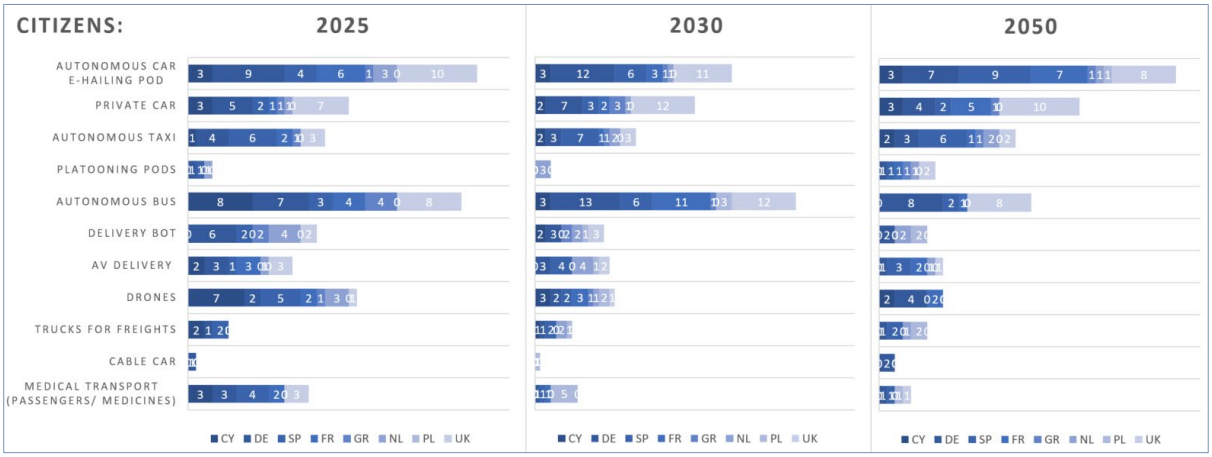

Figure 21: AVs reported by citizens per country for different time horizons.

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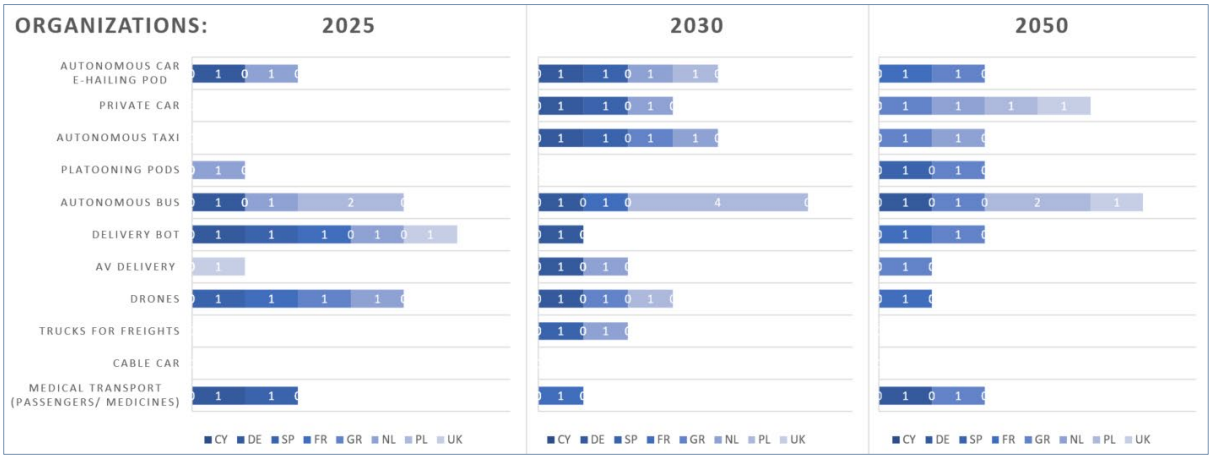

Figure 22: AVs reported by organizations per country for different time horizons.

The aggregated results of the perceptions given by citizens and organizations participants are shown in Figure 23. Autonomous cars and buses are the AVs for passengers mostly expected to be deployed regardless time horizon, while for freights, drones and delivery bots stand out.

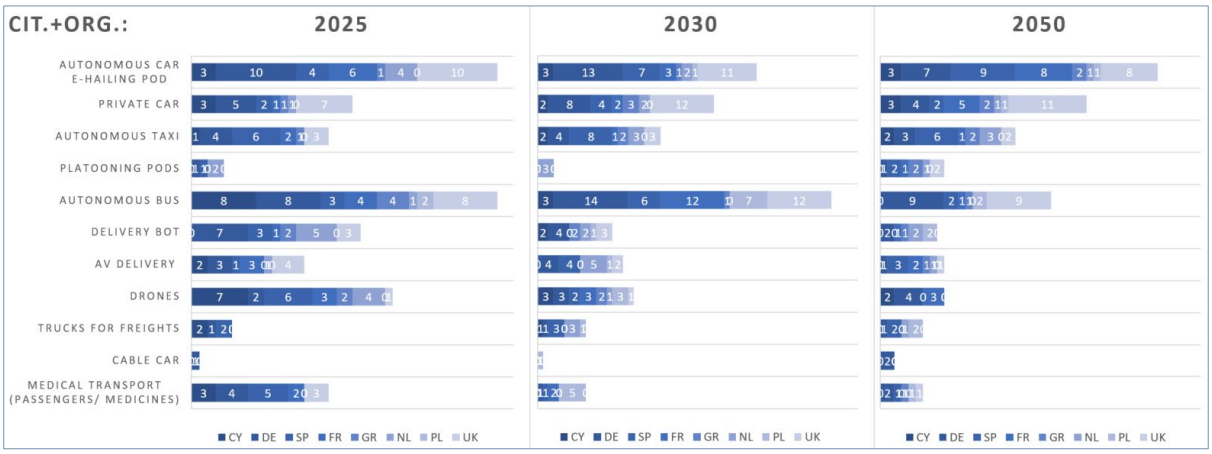

Figure 23 AVs reported by citizens and organizations per country for different time horizons.

Since participants suggested that AVs could be deployed in short term while others consider that a widespread adoption is a complex process that requires addressing technological, regulatory, and societal challenges and for these reasons it is difficult to determine exactly when the vehicles will become a reality. Figure 24 below reflects the analysis of the data collected on this topic at country level.

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