Study on New Mobility Patterns in European Cities: EU-Wide Passenger Mobility Survey

Jimmy Armoogum, Stefano Borgato, Davide Fiorello, Cédric Garcia, Yeshtabye Gopal, Sylvia Maffii, Kees-Jan Mars, Tanja Popovska, Victoire Vincent, Mathieu Bogaert, et al.

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Task A: EU-Wide Passenger Mobility Survey

Final report

Written by Armoogum J., Garcia C., Gopal Y., Borgato S., Fiorello D., Maffii S., Mars K-J., Popovska T., Schlemmer L., Vincent V., Bogaert M., Gayda S.

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Task A: EU Wide passenger mobility survey

Final report

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Disclaimer

Abstract (English)

Mobility is essential to the productive functioning of the economy. However, there are growing concerns about the long-term sustainability of major transportation systems. The European Green Deal (EGD) and the Strategy for Sustainable and Smart Mobility (SSMS) aim to reduce transport-related greenhouse gas emissions by 90% by 2050 compared to 1990 levels, delivered by a smart, competitive, safe, accessible and affordable transport system, as committed by the Climate Law. Mobility surveys provide information on mobility patterns and behaviours, which are essential for formulating and implementing different policy measures.
For these reasons, the European Commission launched an EU-wide survey on New Mobility Patterns covering all mobility modes, including urban and non-urban trips, using the methodology recommended by Eurostat Passenger Mobility Guidelines. The travel survey targeted individuals aged between 15 and 84 years old and was conducted from March to August 2021. It collected information on the number of trips and mobility by mode of transport, with a specific focus on new mobility forms adopted in cities. A systematic review of previous travel surveys conducted at EU and at national levels preceded the survey.

Abstract (Français)

La mobilité est essentielle au fonctionnement productif de l'économie. Cependant, nous nous interrogeons de plus en plus sur la durabilité à long terme des grands systèmes de transport.
Le « European Green Deal » (EGD) et la Stratégie pour une mobilité durable et intelligente (SSMS) visent à réduire les émissions de gaz à effet de serre liées aux transports de 90 %, d'ici 2050 par rapport aux niveaux de 1990, grâce à un système de transport intelligent, compétitif, sûr, accessible et abordable, comme l'a engagé le « Climate Law ». Les enquêtes de mobilité fournissent des informations sur les modèles et les comportements de mobilité, qui sont essentielles pour mettre en œuvre différentes mesures politiques.
Pour ces raisons la Commission européenne a lancé l'enquête européenne sur les transports « New Mobility Pattern », couvrant tous les modes de mobilité, en utilisant la méthodologie recommandée par Eurostat.
L'enquête, menée de mars à août 2021, ciblait les individus âgés de 15 et 84 ans et, mesurait le nombre de déplacements et la mobilité par mode de transport, avec un intérêt particulier pour les nouvelles formes de mobilité adoptées dans les villes. Un examen systématique des précédentes enquêtes sur les déplacements menés au niveau de l'UE et au niveau national a précédé l'enquête.

Executive summary (English)

Mobility is essential to the productive functioning of the economy and individuals' ability to access the opportunities needed to succeed. Transport and mobility services are an important part of the economy, accounting for at least 5% of EU total value added and employing approximately 10.5 million people[1]. Moreover, transportation is an important factor in living a good quality life and improving accessibility and connectivity between places and people. Increased urbanisation, albeit at a slower pace than previous decades, can be seen around the world, including Europe. In 2020, about 72.4% of the EU's total population lives in cities, towns and suburbs and the proportion of urban population continues to grow[2]. As a result, passenger mobility is undergoing major changes and shifts to new paradigms and there is growing concern about the long-term sustainability of major transportation systems, particularly those in cities.

With the European Green Deal (EGD)[3] and the Sustainable and Smart Mobility Strategy (SSMS)[4], the EU is striving to reduce transport-related greenhouse gas emissions by 90% by 2050 compared to 1990 level, delivered by a smart, competitive, safe, accessible and affordable transport system, as required by the Climate Law[5].

There have been significant policy developments and changes in mobility patterns enabled by digital technologies and innovations in recent years. Mobility surveys and data collected on travel behaviour provide essential information about these new trends. This information is instrumental in developing transportation policies and measures to achieve the objectives of sustainable and green mobility. As a result, various data collection methodologies have been proposed in recent decades in different national or regional contexts. However, without harmonised surveys across the Member States, it is difficult to compare statistics. The need for a wider range of harmonised indicators on more detailed sub-populations and regional contexts is rising.

The European Commission launched an EU-wide survey on "new mobility patterns" (NMP) covering all mobility modes, including urban and non-urban trips, using the methodology recommended by Eurostat Passenger Mobility Guidelines. The survey targeted individuals aged between 15-84 years and was conducted from March to August 2021. It measured the number of trips and activity in passenger-kilometres by mode of transport, with a specific focus on new mobility systems adopted in cities (e.g. shared mobility, active mobility and use of alternatively fuelled vehicles). As the COVID-19 pandemic was still ongoing at the time of the survey, the data collected provides insights on the first impacts of the pandemic on passengers' mobility patterns.

Before conducting the survey, a systematic review of previous travel surveys was conducted at EU and at national level, with the aim to identify previous trends and establish a base for comparison.

[1] Review No 09/2018: Towards a successful transport sector in the EU: challenges to be addressed (Landscape review)

[2] https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ilc_lvho01&lang=enhttps://ec.europa.eu/eurostat/statistics-explained/index.php?title=Archive:Urban_Europe_—_statistics_on_cities,_towns_and_suburbs_—_patterns_of_urban_and_city_developments&oldid=298141

[3] https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en

[4] https://transport.ec.europa.eu/transport-themes/mobility-strategy_en

[5] https://ec.europa.eu/clima/eu-action/european-green-deal/european-climate-law_en

National travel surveys were identified in 12 Member States. Some important results obtained from the National Travel Surveys (NTS) review were the following:

- Car is the predominant mode of transport, with an average share of 64% across the 12 Member States where such surveys are available.
- 10% of daily trips are made by public transport, while walking and biking account for 18% and 6% respectively.
- 34.8 km is the average distance travelled per day (all modes included).
- 67 minutes is the average time spent travelling per day.
- 2.7 is the average number of trips per day.

New mobility pattern survey

Some relevant results at EU level from the NMP survey conducted in 2021 show that:

- 53% of respondents have one car in their household and almost 34% live in a household with more than two cars. The share of households with three or more cars available is 6%, but some Member States show much higher values. In rural areas, the share of people living in households with three cars or more is higher.
- Men perform 2.1 trips per day, while women perform 1.9 trips per day.
- Couples with children travel more than any other type of household: 2.4 trips per day, compared to 2 trips per day performed by single parent family or 1.7 trips per day performed by couples without children or single persons.
- Mobility rates are similar for the age groups up to 55 years, after which mobility progressively declines, except when walking is concerned.
- Work accounts for nearly one quarter of short-distance[6] trips made by employed individuals, while education explains nearly 15% of all trips made by students. Shopping is the most frequent travel for people not in employment or education.
- Shopping and personal business[7] account for almost 30 % of the trips, with leisure trips becoming more important on non-working days.
- 2.6% of short-distance trips per day made by women are performed for care/health related purposes while men make only 1.9% trips for these purposes.
- The number of trips is positively correlated with car availability.
- Urban trips account for about a half of short-distance trips. The structure of short-distance trips by purpose on a typical day is very similar across the EU, with commuting, shopping, and other personal business accounting for the largest share of trips (excluding the purpose "home").
- 54% of short-distance trips are made by private car in most Member States, while walking accounts for about 27%.
- Walking is the most popular mode of transport for non-car trips in most of the EU, with the most noticeable exception being the Netherlands, where biking is prevalent.
- The modal split of short-distance trips made on working days is not significantly different from that of an average day and this holds for all EU.
- 27 km per day is the average distance travelled for short-distance trips by EU citizens, with 20 km being the minimum daily average travelled distance. At EU level, the average distance travelled daily is basically the same on working and non-working days, but this does not always hold at Member State level. This result is not directly correlated to the average number of short-distance daily trips.

[6] All trips that are under 300 km.

[7] Personal Business includes care/health, general errands (post office / formalities / seeking for employment / etc.), restaurant / meal (go out for a meal / snack / carry-out) and visiting friends or relative.

- 1h20 minutes is the average duration of short-distance trips per day. This result is correlated with both the average length of trips and the share of urban trips.
- 33 km/h is the average travel speed for passenger cars. For other modes of transport (excluding train), lower values were found, showing that individuals travel at speeds which are well below the technical potential of motorised transport modes.
- 45% of respondents in the EU-27 use petrol fuelled cars for short distance trips[8]. Diesel is the second most used fuel type at 40%. Petrol/diesel hybrid and electric vehicles are used each by only 3% of the respondents.
- The main reasons for choosing to travel by car are: because it is faster, more flexible to use, more comfortable, cheaper, there is no public transport alternative and because it is needed for work.
- 1.4 passengers is the average occupancy rate for private cars, with limited variability across Member States. Occupancy is higher during non-working days, but always well below two persons per car.
- 70% of the surveyed population use ride hailing and 60% use ride sharing less than once a month. Ride hailing (23%) and ridesharing (12%) are the most commonly used new mobility services.

COVID-19 Impact

The pandemic caused by the spread of the COVID-19 virus and the following sanitary measures imposed have caused major disruptions to transport systems and economies all around the world. This required a thorough review and adjustment of the NMP survey[9]. As such, this report also captures the effects of the various waves of the pandemic and some key findings are:

- 64% of respondents said that their travel behaviour was affected by the pandemic; 37% of the respondents reported having experienced significant changes.
- The most visible effect is a **very sharp decline in the number of trips**, experienced by 82% of the respondents who reported having experienced significant changes. 53% of respondents who were somewhat impacted by COVID-19 stated that their trip length did not change, while 66% of respondents whose behaviour changed significantly as a result of the pandemic declared a decrease in trip length.

[8] Fuel type "Other/unknown" is not included.

[9] Which was originally planned to start on March 2020.

Executive summary (Français)

La mobilité est essentielle au fonctionnement productif de l'économie et à la capacité des individus à accéder aux opportunités nécessaires pour réussir. Au sein de l'UE, les services de transport et de mobilité constituent une part importante de l'économie de l'UE, représentant au moins 5 % de la valeur ajoutée totale de l'Europe et employant environ 10.5 millions de personnes[10]. De plus, le transport est un facteur important pour vivre une vie de qualité, améliorer l'accessibilité et la connectivité entre les lieux et les personnes. Malgré un rythme plus lent que celui observé au cours des décennies précédentes, l'urbanisation croissante peut être observée dans le monde entier, y compris en Europe. En 2020, environ 72.4 % de la population totale de l'UE vit dans des villes et des banlieues et la proportion de la population urbaine continue de croître[11]. La mobilité des passagers subit des changements majeurs et passe à de nouveaux paradigmes, nous nous inquiétons de plus en plus de la durabilité à long terme des principaux systèmes de transport, et en particulier de ceux des villes.

Avec le « European Green Deal » (EGD)[12] et la stratégie de mobilité durable et intelligente (SSMS)[13], l'UE s'efforce d'atteindre la réduction de 90 % des émissions d'ici 2050 par rapport à 1990, grâce à un système de transport intelligent, compétitif, sûr, accessible et abordable, comme engagé par la « Climate Law »[14].

Au cours des dernières années, il y a eu des développements politiques importants et des changements dans les formes de mobilité, rendus possibles par les technologies et les innovations numériques récentes. Les enquêtes sur la mobilité et les données collectées sur les comportements de déplacement fournissent des informations essentielles sur les formes de mobilité et les comportements de déplacement. Ces informations sont essentielles pour développer des politiques et des mesures de transport pour atteindre les objectifs de mobilité durable et verte. En conséquence, diverses méthodologies de collecte de données ont été proposées au cours des dernières décennies dans différents contextes nationaux ou régionaux. Cependant, sans enquêtes harmonisées dans les États membres, il est difficile de comparer les statistiques. Le besoin d'un éventail plus large d'indicateurs harmonisés sur des sous-populations et des contextes régionaux plus détaillés augmente.

La Commission européenne a lancé l'enquête à l'échelle de l'UE sur les « nouvelles formes de mobilité » (NMP), couvrant tous les modes de mobilité, y compris les trajets urbains et non urbains, en utilisant la méthodologie recommandée par les lignes directrices d'Eurostat sur la mobilité des passagers. L'enquête ciblait les individus âgés de 18 à 84 ans et elle a été menée de mars à août 2021. Elle mesurait le nombre de déplacements et la mobilité par mode de transport, avec un accent particulier sur les nouveaux systèmes de mobilité adoptés dans les villes (par exemple, la mobilité

[10] Review No 09/2018: Towards a successful transport sector in the EU: challenges to be addressed (Landscape review)

[11] https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ilc_lvho01&lang=enhttps://ec.europa.eu/eurostat/statistics-explained/index.php?title=Archive:Urban_Europe_—_statistics_on_cities,_towns_and_suburbs_—_patterns_of_urban_and_city_developments&oldid=298141

[12] https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en

[13] https://transport.ec.europa.eu/transport-themes/mobility-strategy_en

[14] https://ec.europa.eu/clima/eu-action/european-green-deal/european-climate-law_en

partagée, la mobilité active et l'utilisation de carburants alternatifs). La pandémie de COVID-19 étant toujours en cours au moment de l'enquête, les données collectées peuvent permettre de comprendre les premiers impacts de la pandémie sur les formes de mobilité des passagers.

Avant de mener l'enquête, un examen systématique des précédentes enquêtes sur les déplacements a été effectué au niveau de l'UE et au niveau national dans le but d'identifier les tendances antérieures et une base de comparaison.

Des enquêtes nationales sur les déplacements ont été recensées dans une sélection de 12 États membres. Certains résultats importants tirés des Enquêtes nationales de transports (ENT) peuvent être résumés comme suit :

- La voiture est sans équivoque le mode de transport prédominant, avec une part moyenne de 64 % dans les 12 États membres où de telles enquêtes sont disponibles.
- 10 % des déplacements quotidiens sont effectués en transports en commun, tandis que la marche et le vélo représentent respectivement 18 % et 6 %.
- 34,8 km est la distance moyenne parcourue par jour dans les 12 États membres.
- 67 minutes est le temps moyen de déplacement par jour pour ces États membres.
- 2,7 est le nombre moyen de déplacements par jour dans les 12 États membres.

Nouvelles formes de mobilité dans les villes européennes

Certains résultats pertinents au niveau de l'UE en 2021 peuvent être résumés comme suit :

- 53% des répondants ont une voiture dans leur ménage et près de 34% vivent dans un ménage avec plus de deux voitures. La part des ménages disposant de trois voitures ou plus est de 6 %, mais certains États membres affichent des valeurs beaucoup plus élevées. Pour les personnes vivant en zone rurale, la part de personnes déclarant que leur ménage possède trois voitures ou plus est plus élevée.
- Les hommes effectuent 2,1 déplacements par jour, tandis que les femmes effectuent 1,9 déplacements par jour.
- Les couples avec enfants voyagent plus que tout autre type de ménage : 2,4 voyages par jour, contre 2 voyages par jour effectués par une famille monoparentale ou 1,7 voyages par jour effectués par des couples sans enfants ou des personnes seules.
- Les taux de mobilité sont similaires pour les classes d'âge jusqu'à 55 ans, après quoi la mobilité diminue progressivement, sauf pour la marche.
- Le travail représente près d'un quart des déplacements de courte distance[15] effectués par les personnes en emploi, l'éducation expliquant près de 15 % de l'ensemble des déplacements effectués par les étudiants et les achats étant la raison la plus fréquente des déplacements des personnes sans emploi.

[15] Tous les déplacements inférieurs à 300 km.

- Les achats et les affaires personnelles[16] représentent près de 30 % des déplacement, les déplacements de loisirs devenant plus importants les jours non ouvrables.
- 2,6% trajets de courte distance par jour effectués par les femmes sont fait à des fins de soins/santé alors que les hommes n'effectuent que 1,9% trajets pour ces motifs. Le nombre de déplacements est positivement corrélé à la disponibilité de la voiture.
- Les déplacements urbains représentent environ la moitié des déplacements de courte distance. La structure des trajets de courte distance par objectif au cours d'une journée moyenne est très similaire dans l'UE, les trajets domicile-travail, les achats et les autres affaires personnelles représentant la plus grande part des trajets (non dirigés vers le domicile).
- 54 % des trajets de courte distance sont effectués en voiture particulière dans la plupart des États membres, tandis que la marche représente un peu plus de 27 %.
- La marche est le mode de transport le plus populaire pour les déplacements sans voiture dans la plupart des pays de l'UE, l'exception la plus notable étant les Pays-Bas, où les vélos sont très répandus. La répartition modale des trajets à courte distance effectués les jours ouvrables n'est pas significativement différente de celle de tous les jours et cela vaut pour toute l'UE.
- 27 km par jour est la distance moyenne parcourue pour les trajets de courte distance des citoyens de l'UE, avec 20 km comme distance quotidienne minimale parcourue en moyenne sur les UE-27. Au niveau de l'UE, la distance moyenne parcourue quotidiennement est fondamentalement la même les jours ouvrables et non ouvrables, mais cela ne vaut pas toujours au niveau des États membres. Ce résultat n'est pas directement corrélé au nombre moyen de trajets quotidiens de courte distance.
- 1h20 minutes, c'est la durée moyenne des trajets courts en journée. Ce résultat est corrélé à la fois à la durée moyenne des déplacements et à la part des déplacements urbains.
- 33 km/h est la vitesse moyenne pour les trajets en voiture particulière. Pour les autres modes de transport (à l'exception du train) des valeurs plus faibles ont été trouvées, montrant que les individus se déplacent à des vitesses bien inférieures au potentiel technique des modes de transport motorisés.
- 45% des répondants de l'UE-27 utilisent de l'essence pour des trajets de courte distance parmi les types de carburant connus[17]. Le diesel est le deuxième type de carburant le plus utilisé à 40 %. Les véhicules hybrides essence/diesel et électriques ne sont utilisés chacun que par 3 % de l'UE-27.
- Les principales raisons de choisir de voyager en voiture sont parce qu'elle est plus rapide, plus souple à utiliser, plus confortable, moins chère, qu'il n'y a pas d'alternative aux transports en commun et qu'elle est nécessaire pour le travail.
- 1,4 passager est le taux d'occupation moyen des voitures particulières, avec une variabilité limitée entre les États membres. L'occupation est plus élevée pendant les jours non ouvrables, mais toujours bien inférieure à deux personnes par voiture.
- 70 % de la population interrogée utilisent la course à la demande et 60 % utilisent le covoiturage moins d'une fois par mois. La course à la demande (23

[16] Les affaires personnelles comprennent les soins/santé, les courses générales (poste/formalités/recherche d'emploi/etc.), le restaurant/le repas (sortir pour un repas/goûter/emporter) et la visite d'amis ou de parents.
[17] Le type de carburant "Autre/inconnu" n'est pas inclus.

%) et le covoiturage (12 %) sont les nouveaux services de mobilité les plus couramment utilisés.

Incidence de la COVID-19

La pandémie causée par la propagation du virus COVID-19 et les mesures sanitaires suivantes demandées et imposées ont entraîné des perturbations majeures à l'origine de défis majeurs pour les systèmes de transport et les économies du monde entier. Cela a également demandé un examen approfondi et un ajustement de l'enquête NMP[18]. Ce rapport saisit aussi compte des effets des vagues pandémiques et certaines des principales conclusions sont les suivantes :

- 64 % des répondants ont déclaré que leur comportement de voyage avait été affecté par la pandémie ; 37 % des répondants ont déclaré avoir vécu des changements importants.
- L'effet le plus visible est une très forte baisse du nombre de déplacements, vécue par 82 % des répondants ayant déclaré avoir vécu des changements importants. 53 % des répondants qui ont été quelque peu touchés par la COVID-19 ont déclaré que la durée de leur voyage n'a pas changé, tandis que 66 % des répondants dont le comportement a changé de manière significative à la suite de la pandémie ont déclaré une diminution de la durée de leur déplacement.

[18] Qui devait initialement démarrer en mars 2020.

1 Introduction

Currently, passenger urban mobility is undergoing major changes and shifts to new paradigms: users are increasingly mixing different modes in one single trip or during one day and many cities have registered an increase in the use of active modes like cycling and walking. New technologies have led to the advent of ride-hailing services and hence to a diversification of taxi and private hired vehicles (PHV) services. Moreover, passenger transport operators have increasingly designed their offers towards door-to-door services that are as seamless as possible.

With the European Green Deal (EGD)[19] and the Sustainable and Smart Mobility Strategy (SSMS)[20], the EU is striving to achieve a 90% cut in emissions by 2050, delivered by a smart, competitive, safe, accessible and affordable transport system, as committed by the Climate Law[21]. Seamless, safe and green transport is fundamental tool for achieving these objectives. It is thus crucial to understand peoples' choices and the factors underpinning them regarding the adoption of more sustainable transport modes, including levels of affordability, availability, reliability, safety and comfort levels, for example.

Mobility surveys and other data collections on mobility provide information about travel patterns, trends and behaviour. Understanding the current situation is essential to develop tailored transportation policies and measures which encourage the supply and use of more environmentally friendly transport modes. Various data collection methodologies have been proposed in recent decades at different national or regional levels.

The European Commission launched an EU-wide transport survey to identify emerging mobility patterns in the EU. The present report constitutes the Final Report for Task A of the Study on New Mobility Patterns in European Cities. During the survey the COVID-19 pandemic caused a major disruption in the transport sector and as such this report also captures some of the effects of the COVID-19 pandemic on travel behaviour during the period March-August 2021. The survey used the methodology recommended by Eurostat Passenger Mobility Guidelines. In addition, the need for a wider range of harmonised demand indicators on more detailed sub-populations and regional contexts is rising. Data on transport and mobility is essential for the assessment of past policies, in terms of efficiency and equity, and the elaboration of new policy measures at European level (e.g. to reduce transport emissions), which is only possible if survey methodologies are consistent.

This report is divided into three main chapters: Chapter 2 summarises the information on the results from existing travel surveys and describes the relevant indicators. Chapter 3 summarises the course of the data collection and the methodology used throughout the study: data processing, weighting and data analysis. Chapter 4 presents the results on socio-demographic characteristics, indicators on passenger mobility indicators, as well as on the use of new mobility services. Chapter 5 illustrates the impact of the pandemic on travel behaviour. The key findings are summarised in the conclusion section (chapter 0).

[19] https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en

[20] https://transport.ec.europa.eu/transport-themes/mobility-strategy_en

[21] https://ec.europa.eu/clima/eu-action/european-green-deal/european-climate-law_en

2 Systematic review of existing travel surveys

This chapter provides a summarised version of the systematic review of existing travel surveys. A more detail description can be found in Annex I: Systematic review of existing travel surveys.

The **systematic review** of National Travel Surveys (NTS) and studies related to mobility surveys provided a solid literature background and the latest information about mobility behaviours and trends in the EU. Despite the differences in the methodologies and concepts used to measure mobility and travel behaviour, which hinders comparisons across surveys and hamper meaningful cross-national considerations, the results of this review[22] provided a preliminary quantitative reference to be used as background information for our survey.

Over the course of the years, several **European projects** have focused on the topic of travel surveys and have attempted to provide a response to the methodological and structural differences amongst travel surveys from different Member States.

The need for harmonisation among NTS was first addressed by the 2013 EU research project *OPTIMISM*[23], whose objective was to compare trip information between 10 countries and identify gaps in the harmonisation of travel behaviour data.

Similarly, the EU-funded project *Survey Harmonisation with New Technologies Improvement*[24] (acronym "*SHANTI*"), active between 2009 and 2013, demonstrated that, after a long and demanding post-processing of national mobility data, it was possible to post-harmonise NTS and provide transnational comparisons of surveys.

In 2015 and 2018, the *JRC* conducted two EU-wide surveys[25] to collect comparable indicators on passenger mobility across the EU Member States, as well as on citizens' attitudes towards emerging transport technologies (e.g. Use of ICT applications), new organisational models, and policy measures. In addition, in 2020 an EU-wide survey[26] was carried out to understand individuals' urban mobility patterns in light of the behavioural changes caused by the COVID-19 pandemic.

Also, the *Eurobarometer reports* conducted a series of standard surveys to comprehend EU citizens' attitudes towards urban mobility, including usage of private cars, public transport, and preferences of transport mode.

In addition to these European studies, several mobility surveys have been carried out at a **local level**, as it is often required that cities conduct a local mobility survey before implementing new plans (e.g. Sustainable Urban Mobility Plans) or for other particular purposes. These surveys are usually tailor-made for each specific case/city, often difficult to access and do not follow any particular guidelines or a standardised methodology, thus making it almost impossible to compare them or to obtain homogeneous information across them.

Focusing on the national level, **National Travel Surveys (NTS)** are conducted to monitor travel behaviour by collecting information about the individual or the household

[22] Further details on the indicators and the Member States considered in the review can be found in Annex IV.

[23] https://cordis.europa.eu/project/id/284892/reporting

[24] http://shanti.inrets.fr/

[25] https://publications.jrc.ec.europa.eu/repository/handle/JRC96151

[26] http://www.trt.it/en/PROGETTI/survey-urban-transport-the-aftermath-of-the-covid-19-outbreak/

(socio-economic, demographic, etc.) and a diary of their journeys on a given day (mode of travel, purpose, duration, etc.).

Out of the EU-27 Member States, 24 of them have carried at least one NTS in the past 15 years. The latest available NTS range from 2006 to 2019 (See Table 16). In most cases, it was possible to retrieve final publication reporting details about the methodology adopted and part of the main results achieved.

A detailed analysis of the NTS identified a few general indicators of travel behaviour that could be collected: *modal split*, *average trip distance and duration*, *daily travel distance and time* and *average number of daily trips*. These indicators, which were only available for a limited number of Member States, allowed for some comparison between countries in terms of travel patterns and provided an initial quantitative reference for the results of our survey.

However, for the most part comparisons were limited (or even impossible) due to the variety of methods adopted. Most of the countries use their own national methodologies and do not follow the Eurostat guidelines. In addition, the type and format of data collected was not homogenous, there were differences in the years in which the NTS were conducted and, most importantly, there were differences in the data availability itself.

Results from the available NTS showed that car is unequivocally the predominant mode of transport, with an average share of 64% in the EU Member States. Public transport accounts for 10% of daily trips, while walking and biking for 18% and 6% respectively. Also, the average trip distance is 13.2 km while the average trip duration is 22.2 minutes. Considering the entire day, the average distance travelled per day is 34.8 km while the average time spent travelling per day is 67 minutes. In addition, the average number of trips per day in EU Member States is 2.7.

Finally, the systematic review also focused on surveys on **innovative and shared mobility services**. Over the past few years, innovative services and shared mobility have increasingly become part of citizens' transport choices, however NTS rarely collect data on shared mobility patterns and innovative services. A partial reason for this is that the modal share of these modes is still insignificant at the national scale, compared to the use of more traditional modes.

Still, a considerable number of surveys on innovative and shared mobility have been carried out throughout Europe. They include studies on *Carsharing,* to analyse the impact of the service on car ownership rates and travel practices, including an increase of use of other transportation modes. A survey was also conducted on *Carpooling,* a service promoting the paradigm shift from vehicle ownership to vehicle usage, to assess the environmental impacts of their users. Also, several *Bike sharing* surveys identified the trips characteristics of the service's subscribers, as well as changes in their daily mobility habits. Studies on *Ride Hailing,* whose impacts on cities' volume of automobile traffic has been a widely debated topic, attempt to understand the influence of the service on people's mobility behaviours, including the change in car ownership, change in total kilometres travelled and the shift from other modes of transport since the service became available. Also, studies on *shared e-scooters,* which are increasingly populating European cities' streets, have been carried out to understand which mode has been replaced by this new transport alternative, as well as users' intermodality practices in combination with other modes. Finally, the review considered a survey on *MaaS (Mobility as a Service)* to understand users' approach towards the integration of various forms of transport services into a single mobility service accessible on demand.

However, all the surveys on innovative mobility services are related to specific areas and do not provide generalisable information at European scale at present.

3 Methodological approach

This chapter provides a summarised version of the methodology used throughout the survey. For a more detail description of the methodological approach, see Annex II: Methodological approach.

3.1 Questionnaire

The questionnaire (Annex V) was translated in the official language of each Member State. The structure was organised in four sections, as follows:

- Section 1 included sociodemographic questions about the respondent and their household.
- Section 2 included mobility questions and the travel diary information, followed by questions related to the effects of the COVID-19 pandemic on travel behaviour.
- Section 3 included questions related to vehicle fleet description.
- Section 4 included questions on new mobility patterns and income.

3.2 Conducting the EU-Wide Survey

The target population for this travel survey was citizens between the ages of 15 and 84 years old. The survey fieldwork was carried out mainly using Computer Assisted Web Interviewing (CAWI). For Cyprus, Malta, Luxembourg and Greece, CAWI methodology was combined with Computer Assisted Telephonic Interviewing (CATI) to reach the older population in these Member States (which were more hard-to-reach via CAWI), thus to meet the defined target. The data collection was performed over a period of 21 weeks, starting on 19 March 2021 until 8 August 2021. The fieldwork end date was July for the most Member States, although for some of them, the end date ran into early August in order to complete the sample with the 65-84 age group. In total, 111,525 interviews were completed.

3.3 Data processing

This section presents the data processing methods which were used to ensure that the final database is fit to serve the intended use in a particular context. The main steps of data processing included data cleaning and data enrichment. The different elements of the data processing procedures cannot be strictly separated because they are interdependent and continuously processed.

3.3.1 Data processing on socio-demographic and vehicle fleet description questions

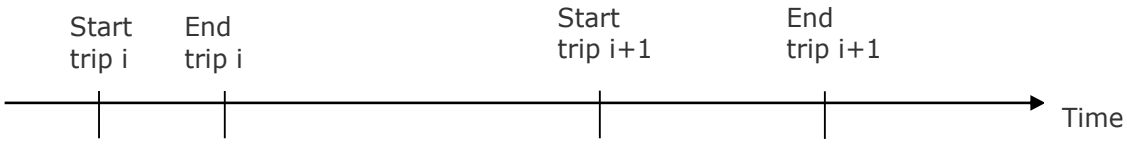
The first step was the detection of outliers, i.e. data that differs significantly from other observations. In addition, inconsistencies between answers of the same respondent were individually analysed along with the trip diary to determine the plausibility of the data. Further checks were conducted (refer to Annex II.6 for more details) when the household size or the numbers of cars or the number of bikes were unrealistically high, to determine if it was a typing error or because of an atypical situation (for example, the household sizes or the number of vehicles could be high due to cohabitation within a household). When typing errors were found, an imputation by hot-deck by class was performed (Andridge & Little, 2010).

3.3.2 Data correction on trip diary questions

This section presents the corrections performed on the data reporting details on trips reported by respondents. This dataset contains information for the 70.5% of respondents who performed at least one trip. Firstly, the trip chronology was checked as follows:

- A verification of the trip start time and trip end time was carried out to get a correct measure of temporal trips sequence, as exemplified in Figure 1 below:

Figure 1 - Illustration of a correct trip sequence



- The post codes were verified and corrected for each trip.

Secondly, the coherence of trips with trip purposes was checked. Thirdly, the trips' speeds were verified. The speeds by travel mode all trips considered, were calculated using the initial trip distances and durations. A comparison was made between the calculated speed and the speeds based on the kernel density estimation to see if it was plausible. If the calculated speed was not in between the minimum and the maximum speeds, using kernel density estimation observations[27], it was declared as unlikely. The median speed of the trip mode was used instead of the mean because the median is not influenced by extremely large values. Lastly, in order to have approximately an equal number of departures from home and return to home, a last trip with trip purpose 'return to home' was added for 4.1% of the respondents.

3.4 Weighting

Generally, the weighting procedures rely on calibration of margins. Calibration consists of adjusting the original (sample) weights[28] so that the reweighted sample conforms to known population external totals. The method forces the estimates to equalise population parameters (e.g. the totals of population in territorial domains), which may be available from an auxiliary source such as administrative data, or from statistical sources such as population Censuses (Eurostat, 2020). The calibration estimator corrects the nonresponse errors when the nonresponse mechanism is explained by the auxiliary information (Eurostat, 2008).

This stage is essential to ensure a representative sample and comparison with some other statistical sources (e.g. other national surveys). The calibration on margins must be implemented both on variables which explain (or are correlated with) transport behaviour, and also on the variables that explain the non-response mechanism for which the total is accurately known (Deville & Särndal, 1992).

[27] Kernel density estimation is a technique that enables the user to better analyse the distribution and can give valuable indication of features such as skewness in the data Terrell, George R., and David W. Scott. "Variable kernel density estimation." *The Annals of Statistics* (1992): 1236-1265.

[28] Original weight is the total population of a Member State divided by the number of interviews.

3.5 Data analysis method

All the passenger mobility indicators provided in this report are calculated based on weighted data, in a similar manner as in the Eurostat guidelines on Passenger Mobility Statistics (page 32). An example of the calculation for the number of trips per person per day is presented in Annex II.6: Calculation example for the number of trips per person per day. Tables are generated for each indicator and the graphs are produced in Excel.

4 Current EU mobility patterns

This section presents the results of the European Mobility Survey at EU and at Member State level, using the indicators presented in the Eurostat guidelines on Passenger Mobility Statistics.

4.1 Sociodemographic characteristics

Table 1 displays the respondents' distribution across different sociodemographic categories. At the EU level in 2021, 49% of respondents were male and 51% female, which is in line with EUROSTAT data[29]. The proportion of individuals with 'Upper secondary education and lower' was about 72%. 38% of the respondents live in cites, 28% lives in rural areas. Almost 80% of respondents held a driving licence. 13% of the individuals over 15 years old live in a non-motorised household. 53% of the respondents have one car in their household and almost 34% of the individuals live in a household with more than two cars. More than 50% of the respondents belong to a 'couple' household, with or without children.

The situation varies across the EU Member States. There are some differences in terms of age structure, with the share of individuals older than 55 years ranging from 31% (in Ireland) to 40% in several Member States (Bulgaria, Croatia, Finland, Germany, Italy and Latvia).

The differences related to car availability are more significant. On average, the majority of the people declared "no car" or "one car" maximum (80% in Hungary), with very low variations and very few exceptions (Malta, Luxembourg and Cyprus). However, in almost all Member States, the share of people declaring no car in the household (13% at EU) is less than people declaring having two cars in the household (28% at EU), except for Estonia, Hungary and Romania. As shown in Table 2, in some Member States (Bulgaria, Romania, Hungary, Estonia, Latvia, Denmark, Finland and Sweden), the share of individuals living in a household without any available car is 20% or more, compared to an average EU value of 13%.

At the same time, the share of individuals with three or more cars available was 6% in EU, but there were some Member States which showed much higher values, namely Cyprus (32%) and Malta (22%). Shares well above the average are also observed in Luxembourg (16%), Slovenia (15%), Austria and Portugal (11%) and Croatia (10%).

As shown in Table 3, for people living in rural areas, the share of people declaring that their household has three or more cars is higher when compared to urban areas. The share of people living in a household having no car at all is the highest for cities, with a share of 17%.

[29] https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=demo_pjan&lang=en

Table 1 - Distribution of respondents by different categories, in EU-27

Variable		Population percentage
Gender	**Male**	49.0%
	Female	51.0%
Age band	**From 15 to 19**	6.3%
	From 20 to 24	6.6%
	From 25 to 29	7.2%
	From 30 to 34	7.8%
	From 35 to 39	8.1%
	From 40 to 44	8.4%
	From 45 to 49	8.7%
	From 50 to 54	8.9%
	From 55 to 59	8.6%
	From 60 to 64	7.9%
	From 65 to 69	7.1%
	From 70 to 74	6.8%
	From 75 to 79	5.9%
	From 80 to 84	1.8%
Highest education level	**Upper secondary education and lower**	71.4%
	Post-secondary non-tertiary education and higher	25.1%
	No response	3.5%
Driving license holding (B license)	**Yes**	79.5%
	No	16.8%
	Not concerned (less than 18 years old)	3.0%
	I would rather not say or refuse to answer	0.7%
Type of household	**Single**	17.2%
	Couple without children	22.1%
	Couple with children	37.2%
	Single Parent family	7.8%
	Other (cohabitation…)	13.1%
	No response	2.5%
Degree of urbanisation	**Cities (densely populated areas)**	37.9%
	Towns and suburbs (intermediate density areas)	33.9%
	Rural areas (thinly populated areas)	28.2%
Number of cars in the household	**0**	13.2%
	1	53.0%
	2	27.7%
	3 or more	6.2%

Source: DG MOVE, European Passenger Mobility Survey, 2022

Table 2 – Car availability in the household

	No car	1 car	2 cars	3 or more cars
European Union	**13%**	**53%**	**28%**	**6%**
Belgium	11%	55%	27%	7%
Bulgaria	22%	50%	22%	6%
Czechia	17%	51%	25%	7%
Denmark	20%	55%	21%	4%
Germany	15%	55%	24%	6%
Estonia	24%	47%	23%	6%
Ireland	9%	49%	35%	8%
Greece	12%	52%	30%	6%
Spain	8%	59%	28%	4%
France	8%	53%	33%	6%
Croatia	10%	54%	26%	10%
Italy	5%	52%	35%	8%
Cyprus	3%	23%	41%	32%
Latvia	22%	50%	21%	7%
Lithuania	19%	52%	23%	6%
Luxembourg	6%	38%	39%	16%
Hungary	28%	52%	16%	4%
Malta	14%	29%	35%	22%
Netherlands	15%	58%	23%	4%
Austria	10%	48%	31%	11%
Poland	17%	51%	25%	7%
Portugal	8%	45%	36%	11%
Romania	33%	46%	17%	4%
Slovenia	5%	41%	39%	15%
Slovakia	15%	51%	26%	8%
Finland	20%	51%	23%	6%
Sweden	23%	49%	22%	6%

Source: DG MOVE, European Passenger Mobility Survey, 2022

Table 3 – Distribution of number of cars by degree of urbanisation, EU-27

	No car	1 car	2 cars	3 or more cars
Cities (densely populated areas)	17%	56%	23%	4%
Towns and suburbs (intermediate density areas)	11%	52%	30%	7%
Rural areas (thinly populated areas)	10%	50%	31%	8%

Source: DG MOVE, European Passenger Mobility Survey, 2022

4.2 Passenger mobility indicators at EU level and at Member State level

This section describes passenger mobility at EU level and at Member State level regarding short-distance mobility trips, i.e. all trips with distances less than 300 km and urban mobility trips, i.e. all trips within the same Functional Urban Area (FUA)[30] with distances of less than 100 km. More details can be found in the appendix where corresponding tables with the confidence intervals for the most important indicators are reported.

4.2.1 Travel behaviours

In the EU-27, men have around 0.2 more trips than women. Table 4 shows that male respondents made on average 2.13 trips per day, while women made 1.92 trips per day. Figure 2 shows the number of trips by gender across the Member States. Women have lower shares than men in terms of the number of trips made in almost all Member States, except Romania, where there is no statistically significant difference between men and women (the rate is higher by 0.02 for women). The differences in the number of trips made by men to women ranges from 0.03 to 0.54 in Finland and Latvia, respectively.

Mobility is quite similar for individuals aged between 15 and 54 years, but then progressively declines for older age groups (Table 4). When comparing the number of trips among the 15-29 age group to the 30-64 age group and the 65-84 age groups in the EU-27, it is evident that the 30-64 age group makes 0.24 less trips, and the 65-84 age group makes 1.01 less trips, when compared to the 15-29 age group (Figure 3).

A correlation can be found between mobility and education level, with a higher average number of trips observed for those with an education level higher than 'Post-secondary non-tertiary education'.

Those living in a household type 'couple with children' do more trips than any other type of household. This is partly due to the fact that these individuals need to accompany their children to school, kindergarten and recreational activities, although generally the number of trips for other trip purposes is higher as well.

The number of vehicles available in the household was found to be correlated with different mobility levels. Basically, the more cars available in the household, the higher is the average number of trips, even if the difference between the group of individuals living in households with two cars available and the group of those living in households with three or more cars available is minor and not significant. It could be that car availability induces more mobility, or that individuals who need to travel more tend to have more cars. Not surprisingly, the number of trips is also correlated with having a driving licence.

As shown in Table 5, mobility on working days (Monday to Friday) is significantly higher than during the weekend. Sunday is the day of the week where the least trips are made.

[30] Definition provided in glossary.

Table 4 - Distribution of mobility by different categories, EU-27

Variables		Average number of short-distance trips	Mobility rate	Number of trips per mobile individual
Gender	Male	2.13	71%	3.0
	Female	1.92	63%	3.0
Age band	From 15 to 19	2.33	74%	3.1
	From 20 to 24	2.37	75%	3.2
	From 25 to 29	2.43	77%	3.2
	From 30 to 34	2.43	76%	3.2
	From 35 to 39	2.3	75%	3.1
	From 40 to 44	2.33	73%	3.2
	From 45 to 49	2.28	73%	3.1
	From 50 to 54	2.05	68%	3.0
	From 55 to 59	1.89	65%	2.9
	From 60 to 64	1.72	60%	2.9
	From 65 to 69	1.55	57%	2.7
	From 70 to 74	1.35	51%	2.6
	From 75 to 79	1.19	45%	2.6
	From 80 to 84	1.28	50%	2.6
Highest education level	Upper secondary education and lower	1.94	65%	3.0
	Post-secondary non-tertiary education and higher	2.31	74%	3.1
	No response	1.54	52%	3.0
Driving licence holding (B licence)	Yes	2.12	70%	3.0
	No	1.53	54%	2.8
	Not concerned (less than 18 years old)	1.39	53%	2.6
	No response	2.32	75%	3.1
Type of household	Single	1.72	61%	2.8
	Couple without children	1.72	61%	2.8
	Couple with children	2.38	74%	3.2
	Single Parent family	2.02	66%	3.1
	Other (cohabitation...)	2.01	66%	3.0
	No response	1.56	56%	2.8

Number of cars in the household	**0**	1.42	50%	2.8
	1	1.92	66%	2.9
	2	2.41	74%	3.3
	3	2.47	75%	3.3
	Total	2.02	67%	3.0

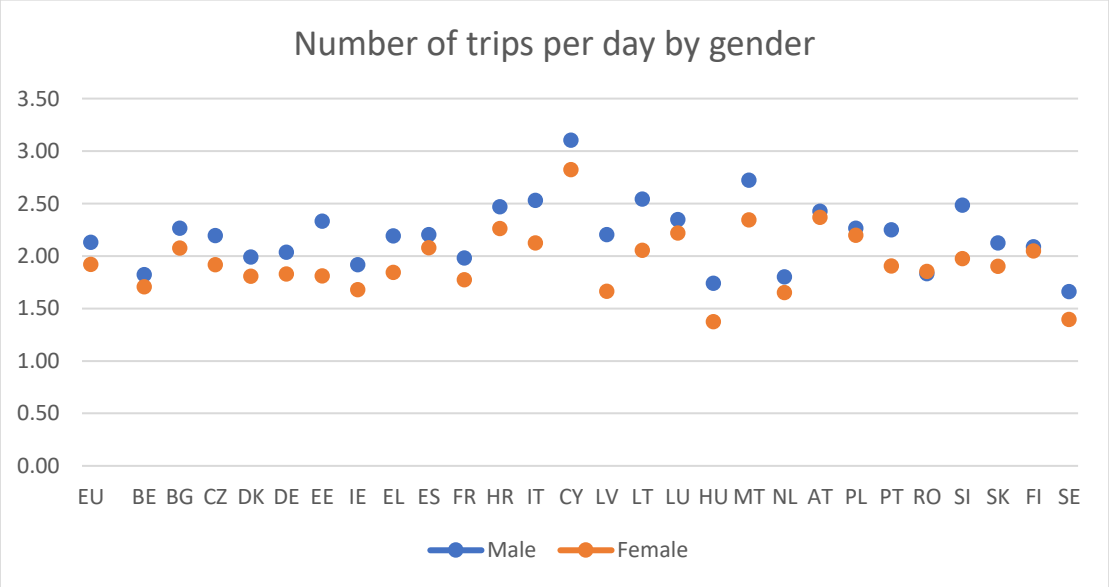
Source: DG MOVE, European Passenger Mobility Survey, 2022

Table 5 – Mobility by day of the week, EU-27

		Average number of short-distance trips	**Mobility rate**	**Number of trips per mobile individual**
Day	**Monday**	2.05	67%	3.1
	Tuesday	2.20	71%	3.1
	Wednesday	2.15	70%	3.1
	Thursday	2.09	69%	3.0
	Friday	2.26	72%	3.1
	Saturday	1.93	66%	2.9
	Sunday	1.48	54%	2.7
	Total	2.02	67%	3.0

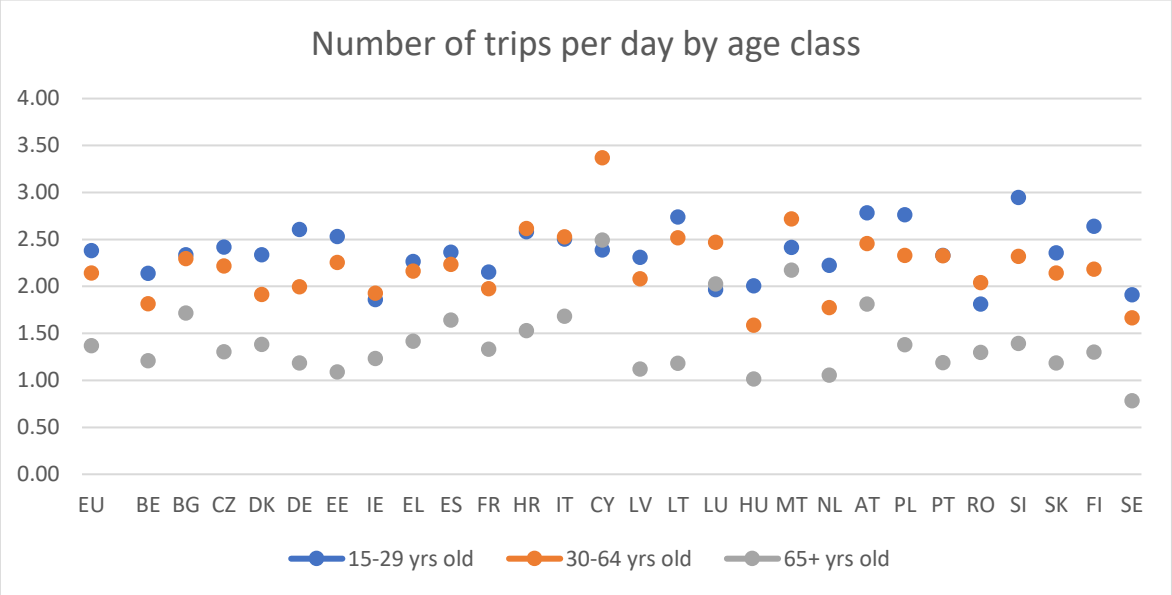
Source: DG MOVE, European Passenger Mobility Survey, 2022

Figure 2 – Number of trips per day by gender



Source: DG MOVE, European Passenger Mobility Survey, 2022

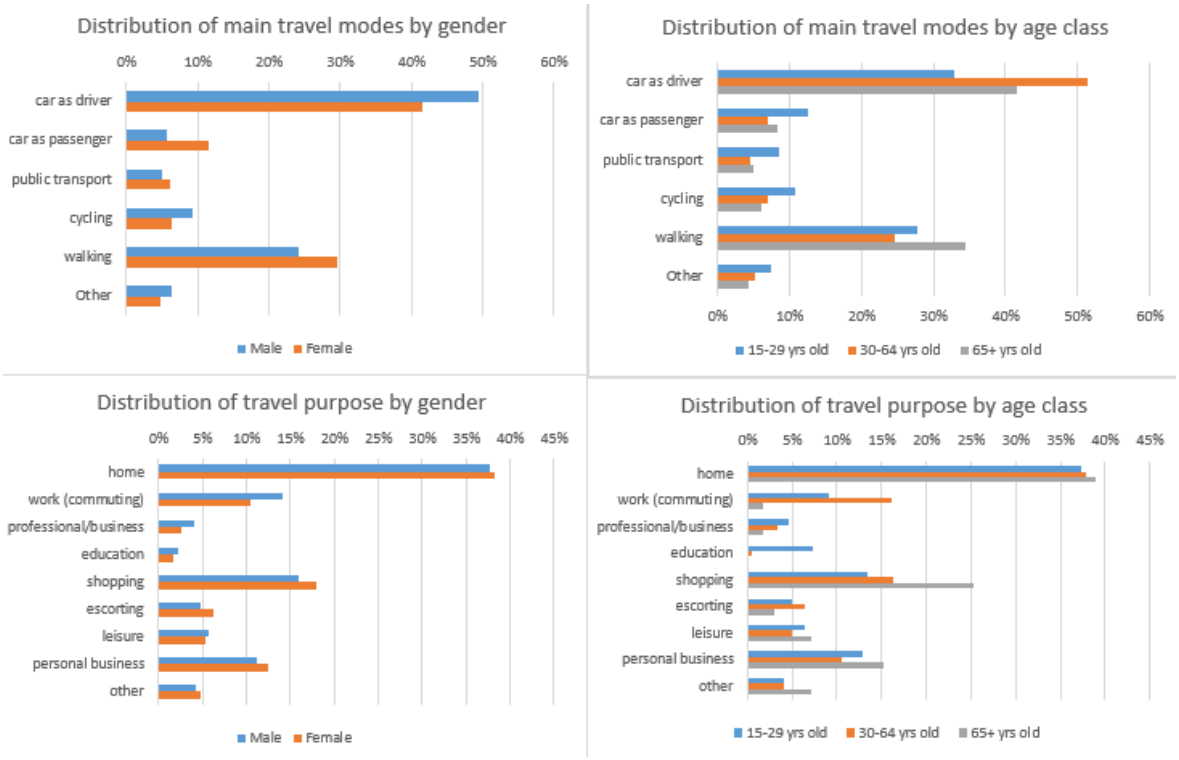
Figure 3 – Number of trips per day by age group



Source: DG MOVE, European Passenger Mobility Survey, 2022

Trips are made by different modes and for different purposes (Figure 4). When car is the main mode, men tend to make more trips as drivers while women tend to be passengers. However, this holds mostly for individuals aged between 30 to 64 years old. The second most common mode is walking. Women tend to walk more, particularly those older than 65 years. Men between the ages of 30 and 64 years old tend to use public transport less than other groups. With regards to the travel purpose, most trips made are linked to returning home, particularly among women and people older than 65 years. However, a significant share of women belonging to the 65 plus years old age group make trips for shopping. Unsurprisingly, none of the 65 plus year old citizens travelled for education-related purposes (i.e., travelling to/from school/university).

Figure 4 – Distribution of number of trips by main travel mode and travel purpose by gender and by age group, in EU-27



Source: DG MOVE, European Passenger Mobility Survey, 2022

The difference in the average short-distance trips by gender for detailed purposes is not very large (Table 6). The largest difference in number of trips is observed for the purpose 'Usual place of work', where men make 0.1 more trips than women. For purposes such as 'purchases', 'other drop off' and 'general errands', the number of trips made is similar.

Table 6 - Average number of short-distance trips per day by detailed travel purpose by gender for short-distance trips, in EU-27

Purpose	Average number of short-distance trips per day	
	Male	Female
Return home	0.77	0.70
Return to second home / occasional housing / hotel / other residence	0.03	0.03
Usual place of work	0.30	0.20
Work related (meeting / etc.)	0.09	0.05
Attend school as a student	0.05	0.03
Purchase groceries	0.26	0.27
Purchases other than groceries	0.07	0.08
Care / health	0.04	0.05
General errands (post office / formalities / seeking for employment / etc.)	0.04	0.04
Leisure / sports / cultural / library / associative activities	0.12	0.10
Restaurant / meal (go out for a meal / snack / carry-out)	0.04	0.04
Visiting friends or relative	0.10	0.11
Drop off /pick up someone: kindergarten / crèche / school / childcare	0.07	0.09
Drop off /pick up someone: train station or airport	0.01	0.01
Other drop off /pick up (e.g.: drop off: drop off someone to hospital, etc.)	0.02	0.02
Other	0.09	0.09
Total	2.13	1.92

Source: DG MOVE, European Passenger Mobility Survey, 2022

Short distance trips are made for various purposes. As mentioned above, the most frequent purpose is 'returning home' (Table 7). This shows that a large part of individuals' mobility follows the pattern 'home – destination – home'. However, the share of trips to home is below 50%, meaning that trip chains that include non-home-based trips are also part of common mobility patterns. Excluding trips to home, the main purposes to travel are work, shopping and other personal business.

The relevance of travel purposes differs according to employment status, with work accounting for nearly one quarter of trips made by employed individuals, education explaining nearly 15% of all trips made by students and shopping being the most frequent reason why non-employed individuals travel.

Table 7 – Distribution of short-distance trips by purpose

Trip purpose	Employed	Students	Others	Total population
Return to home	38%	38%	38%	**38%**
Work and business	24%	4%	3%	**16%**
Education	1%	14%	1%	**2%**
Shopping	14%	13%	24%	**17%**
Escorting	6%	4%	6%	**6%**
Leisure	5%	9%	7%	**6%**
Personal business[31]	10%	14%	15%	**12%**
Other	3%	5%	7%	**5%**
Total	100%	100%	100%	**100%**

Source: DG MOVE, European Passenger Mobility Survey, 2022

Short distance trips are made mainly by car, at over five trips out of ten (Table 8), and most car trips are made as a driver. Walking is the second most transport mode, accounting for more than 25% of trips. When cycling is also considered, some 30% of all short-distance trips are made by active modes of transport.

Table 8 – Distribution of short-distance trips by mode of transport

Mode de transport	Share
car as driver	46%
car as passenger	8%
motorcycle/moped	2%
Public Transport	6%
cycling	8%
walking	27%
Other	4%
Total	**100%**

Source: DG MOVE, European Passenger Mobility Survey, 2022

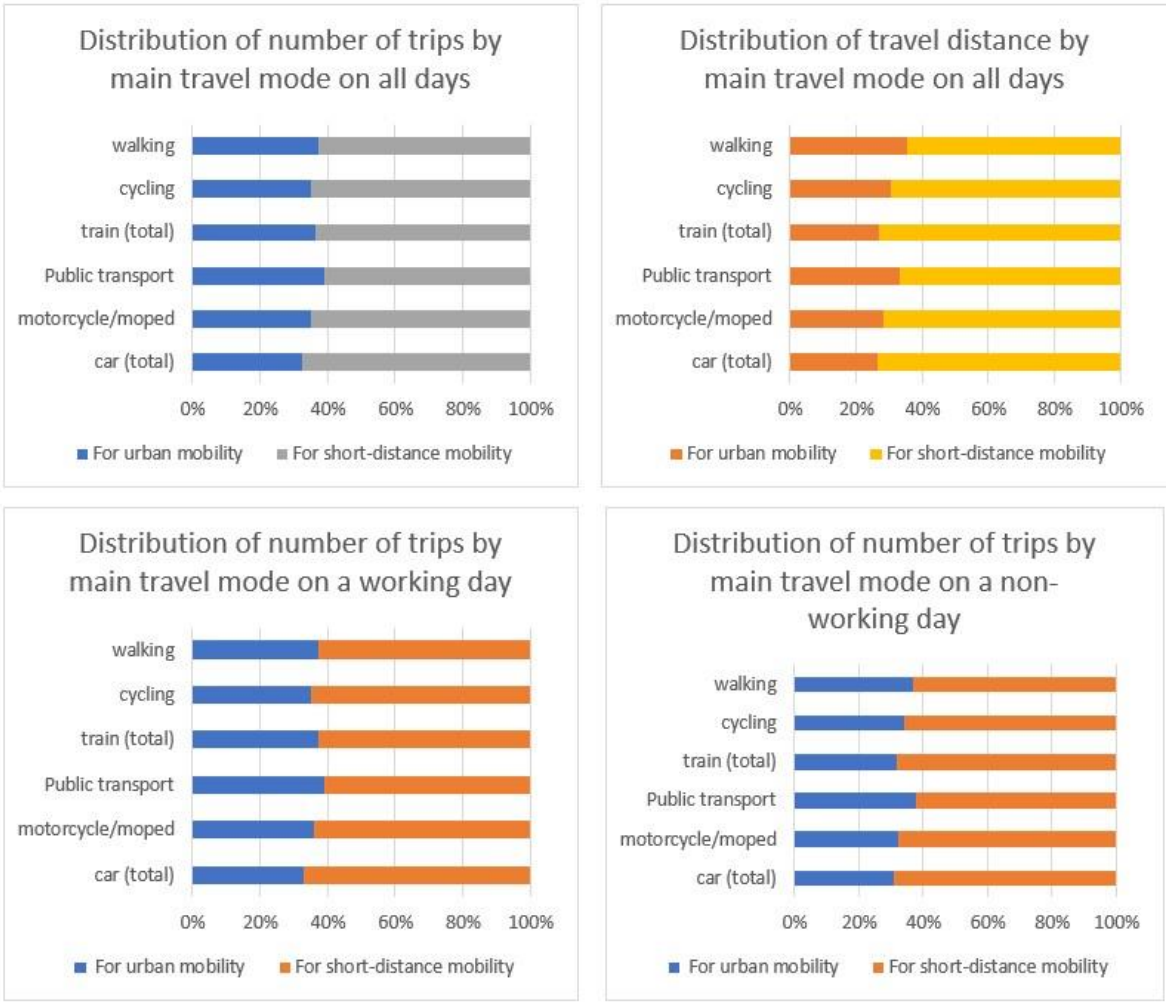
When comparing the number of trips and travelled distance by main travel mode on all days in the EU-27, it is clear that all modes have a higher share for short-distance mobility. Figure 5 shows that all modes have a share of more than 50% of number of trips and travelled distance for short-distance mobility, regardless of the day, with car (total)[32] having the highest share and public transport having the lowest share. People have a larger share of urban trips on a working day than on a non-working day. Train (total)[33] and public transport are the two modes with the highest share of number of trips on a working day compared to a non-working day.

[31] Personal Business includes care/health, general errands (post office / formalities / seeking for employment / etc.), restaurant / meal (go out for a meal / snack / carry-out) and visiting friends or relative.

[32] Car (total) includes car as driver and car as passenger.

[33] Train (Total) includes high-speed train, urban rail and regular/regional train.

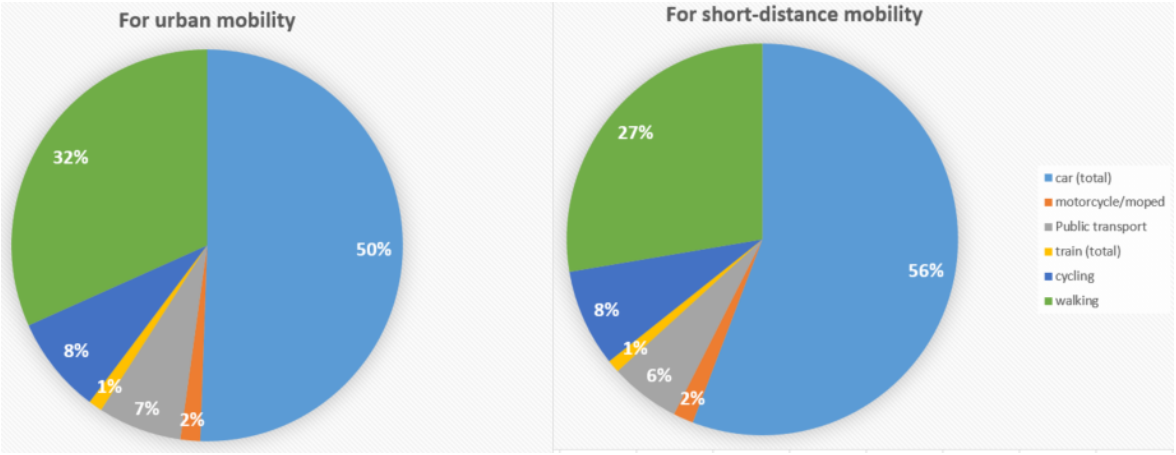
Figure 5 - Distribution of number of trips and travelled distance by main travel mode



Source: DG MOVE, European Passenger Mobility Survey, 2022

The car (total) is the mode that dominates the composition of an average trip on all days, for both urban and short-distance mobility, at more than 50%. An average trip involves more than 25% of walking every day, regardless of the type of mobility (Figure 6).

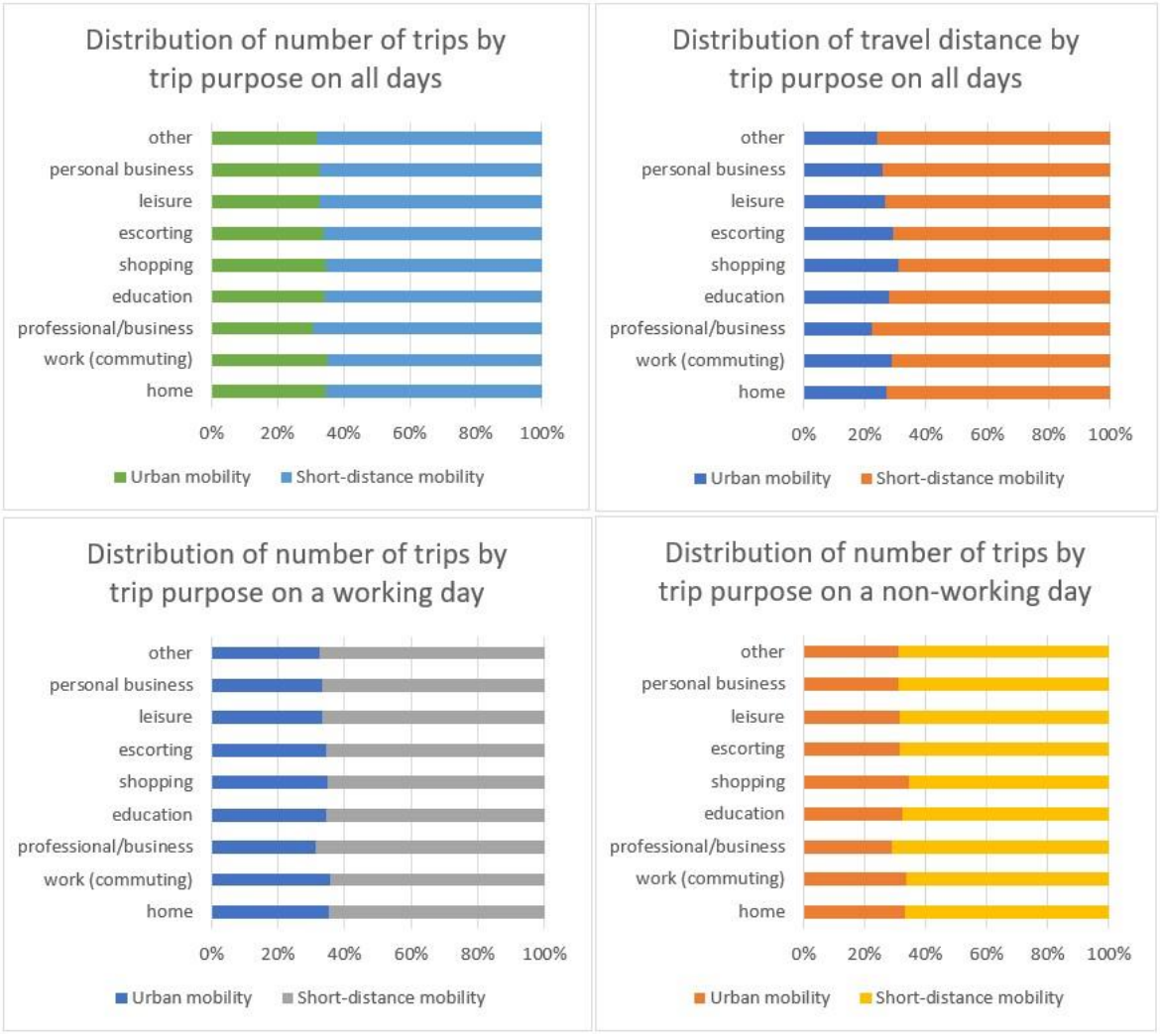
Figure 6 - Composition of an average trip by main travel modes on all days



Source: DG MOVE, European Passenger Mobility Survey, 2022

The distributions of number of trips and distance travelled across all days show that most of the trips made, regardless of the trip purpose, are short-distance mobility trips. Figure 7 shows that the share for number of trips and travelled distance is 50% higher for short-distance mobility trips, with business/professional having the highest share and shopping the lowest. The structure is similar for working and non-working days.

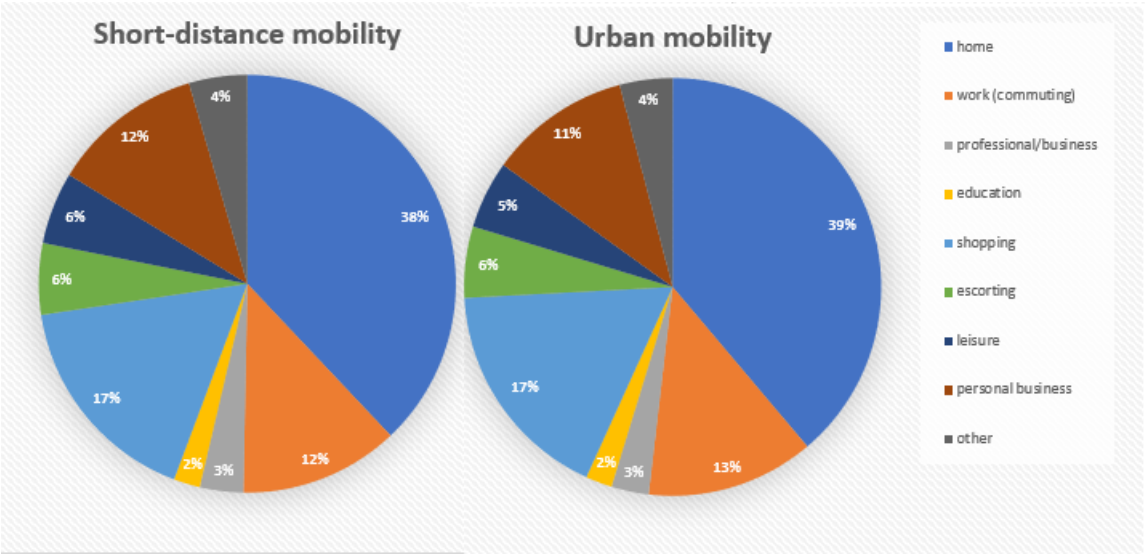
Figure 7 - Distribution of number of trips and travelled distance by travel purpose



Source: DG MOVE, European Passenger Mobility Survey, 2022

On all days, for both urban and short-distance mobility, 'return home' dominates the composition of an average trip. 'Shopping', for both types of mobility, has a share of 17% while 'work' is 12% for short-distance mobility and 13% for urban mobility (Figure 8).

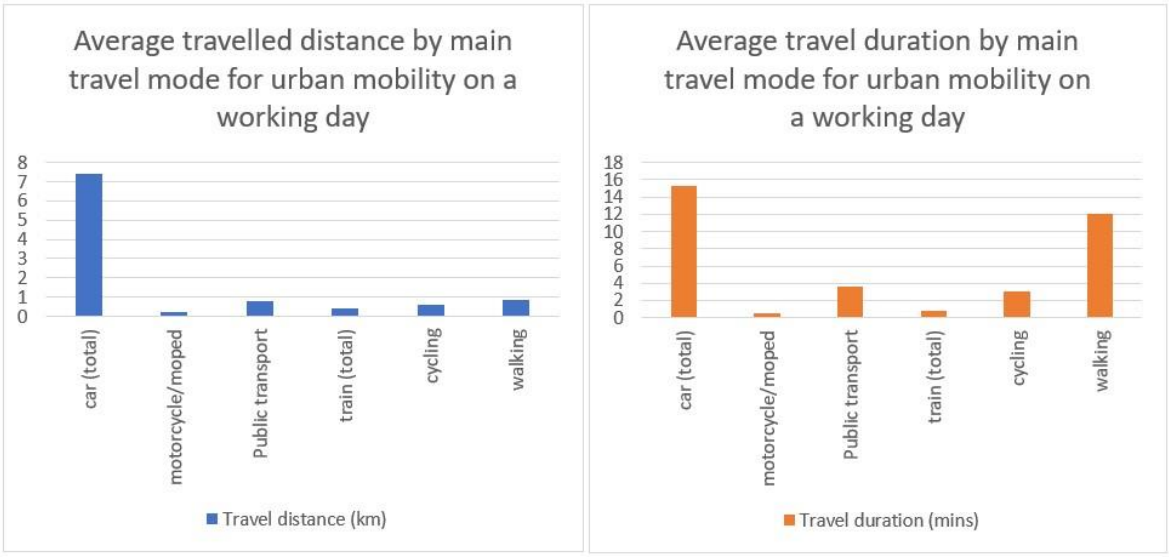
Figure 8 - Composition of an average trip by trip purpose on all days



Source: DG MOVE, European Passenger Mobility Survey, 2022

Figure 9 shows that for urban mobility on a working day, car (total) has the highest travelled distance and travelled duration at approximately 7 km and 15 minutes. The least used mode is the motorcycle/moped. Walking is the second most used mode with a distance of less than 1 km and duration of around 12 minutes.

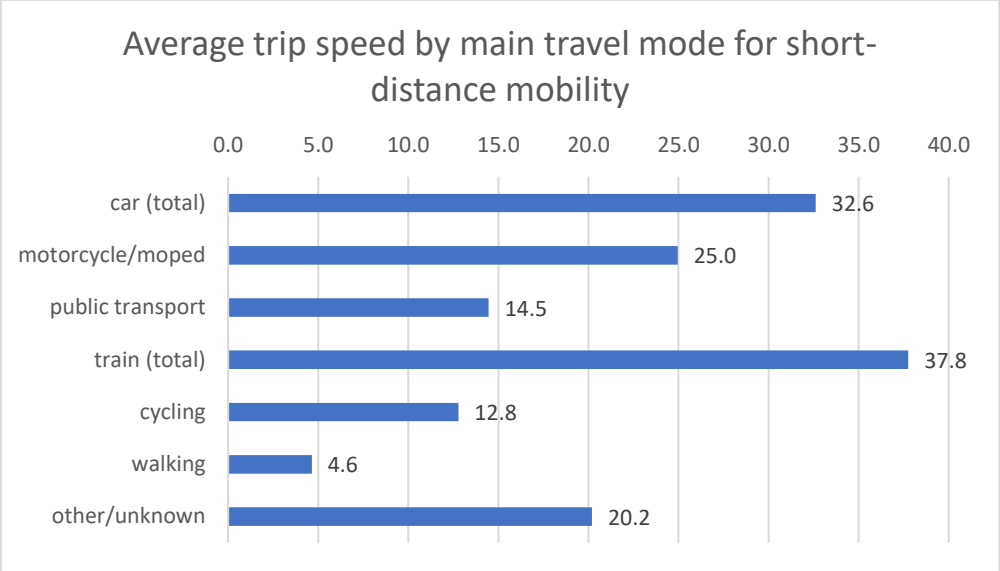
Figure 9 – Average travelled distance (km) and duration (minutes) by main travel mode for urban mobility on a working day



Source: DG MOVE, European Passenger Mobility Survey, 2022

Figure 10 indicates that the average trip speed does not exceed 38 km/h. In particular, for the 2 private motorised modes (car and motorcycle), their average speed is much smaller than their technical potential.

Figure 10 – Average trip speed (km/h) by main travel mode for short-distance mobility on all days



Source: DG MOVE, European Passenger Mobility Survey, 2022

Table 9 shows the distribution of urban car trips by distance classes. For a distance less than 3 km, Romania has the smallest percentage of car trips (7%) while Cyprus has the highest number of trips by car (26%). However, when considering the number of trips with travelled distance 10 km and more, Luxembourg had the highest number of trips (61%) while Cyprus has the lowest (29%).

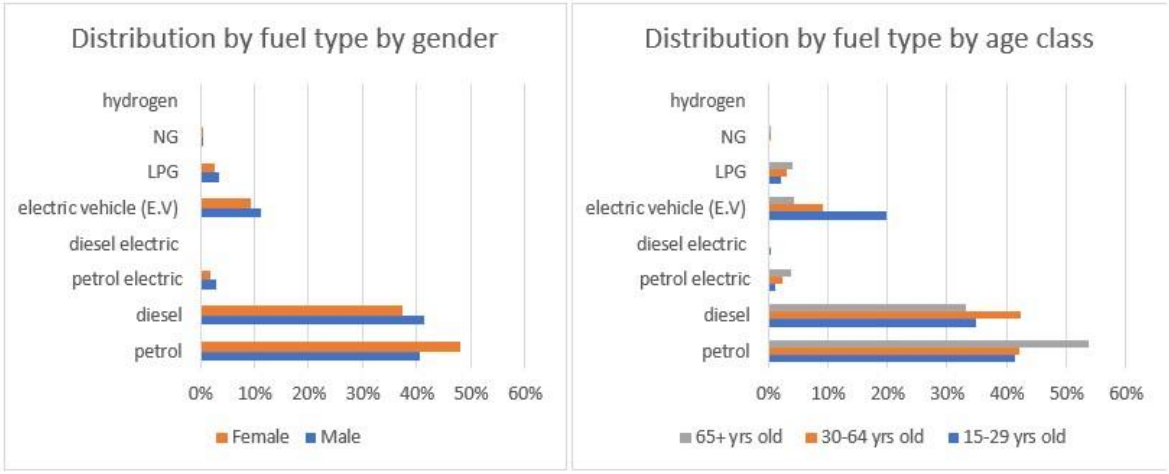
Table 9 - Distribution of urban car trips by distance classes

	Less than 3 km	Between 3 and 5 km	Between 5 and 10 km	10 km or more
EU	12%	14%	26%	48%
BE	11%	15%	27%	46%
BG	9%	18%	27%	46%
CZ	12%	13%	22%	53%
DK	11%	13%	26%	50%
DE	13%	16%	27%	44%
EE	20%	20%	29%	32%
IE	11%	24%	26%	39%
EL	19%	17%	24%	40%
ES	10%	13%	24%	53%
FR	10%	13%	25%	53%
HR	12%	16%	27%	44%
IT	14%	14%	29%	43%
CY	26%	17%	28%	29%
LV	14%	15%	27%	43%
LT	9%	10%	38%	44%
LU	11%	10%	17%	61%
HU	12%	13%	23%	52%
MT	12%	20%	35%	32%
NL	12%	14%	21%	53%
AT	13%	16%	24%	48%
PL	9%	14%	26%	51%
PT	16%	14%	25%	45%
RO	7%	9%	30%	53%
SI	8%	11%	24%	57%
SK	15%	13%	36%	35%
FI	12%	16%	19%	53%
SE	14%	12%	20%	54%

Source: DG MOVE, European Passenger Mobility Survey, 2022

Differences can be observed with regards to the type of fuel used. Women tend to use petrol powered vehicles more, whereas men tend to use diesel, electric vehicles and LPG powered vehicles more (Figure 11). When considering electric vehicles, the age group 15 to 29 years old uses electric vehicles the most, while a higher share of 65+ years old individuals tend to use petrol powered vehicles. As for the diesel-powered vehicles, on average, people aged between 30 to 64 years old use more diesel-powered vehicles than the other age groups.

Figure 11 - Distribution of travelled distance by fuel type and by gender and age group



Source: DG MOVE, European Passenger Mobility Survey, 2022

4.2.2 Mobility indicators

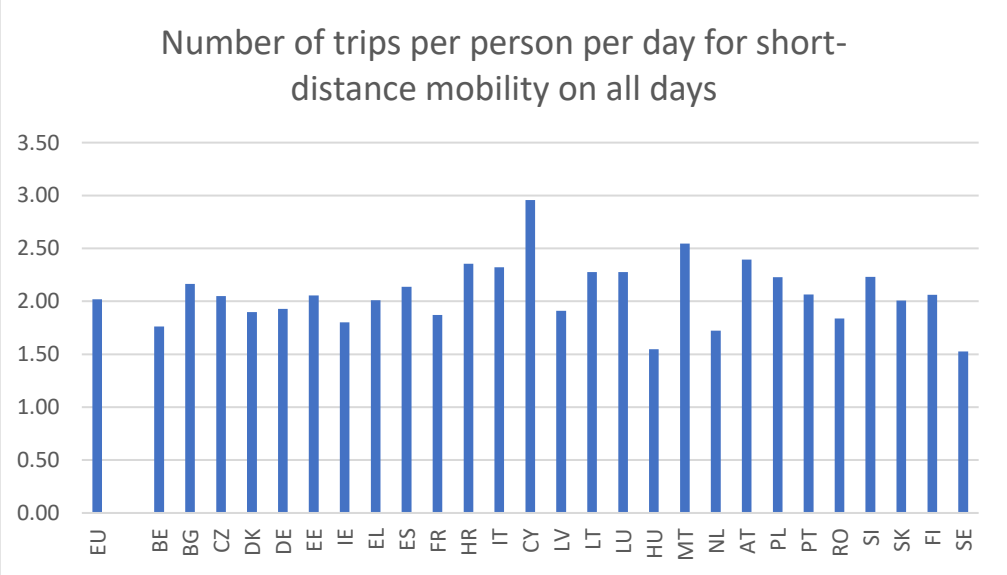
4.2.2.1 SHORT-DISTANCE AND URBAN TRIPS PER PERSON PER DAY

This section presents graphs with mobility indicators across the Member States. More details can be found in Annex II where corresponding tables with the confidence intervals for the most important indicators are reported.

Figure 12 shows that the average number of short-distance daily trips per person considering all days of the week varies across the EU Member States. In the EU-27, on average a person makes 2.0 short-distance trips. In some half of the Member States, the average number of trips lies in the range of ±10% than the EU value. Member States where the average number is clearly above the average are generally those Member States where car availability is higher. As shown in section 4.1, Cyprus, which is the Member State where the average number of trips is higher (nearly three trips per day), is also the Member State where the largest share of individuals lives in households with three or more available cars. Malta is second in both rankings and other Member States with higher car availability, like Luxembourg, Austria, Croatia and Slovenia, also present a number of daily trips above the average.

Car availability is not the only factor explaining differences in the number of trips made by Member State; for instance, in Estonia and Bulgaria, the number of available cars is lower than in other Member States, but the daily number of trips is slightly above the average.

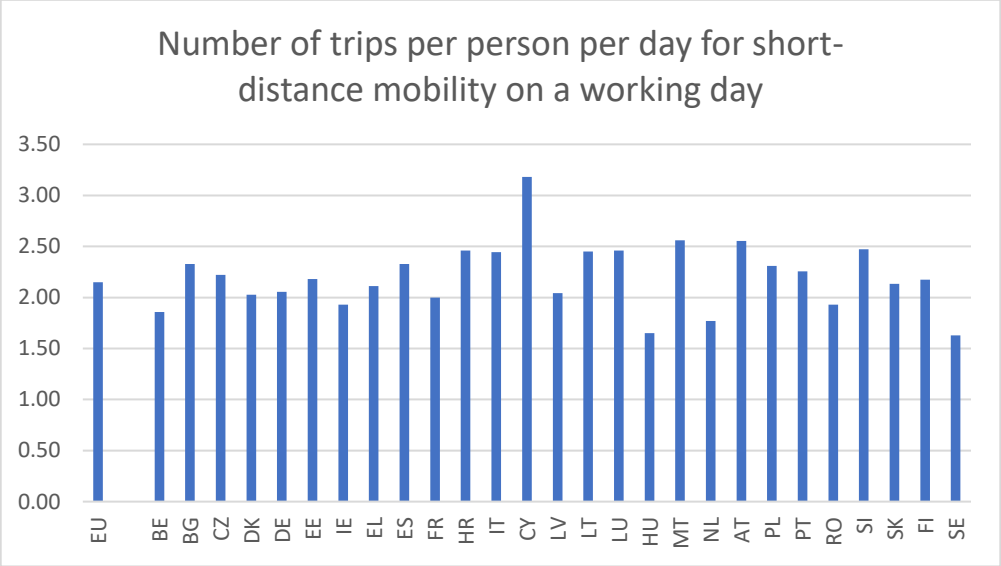
Figure 12 - Number of trips per person per day for short-distance mobility on all days



Source: DG MOVE, European Passenger Mobility Survey, 2022

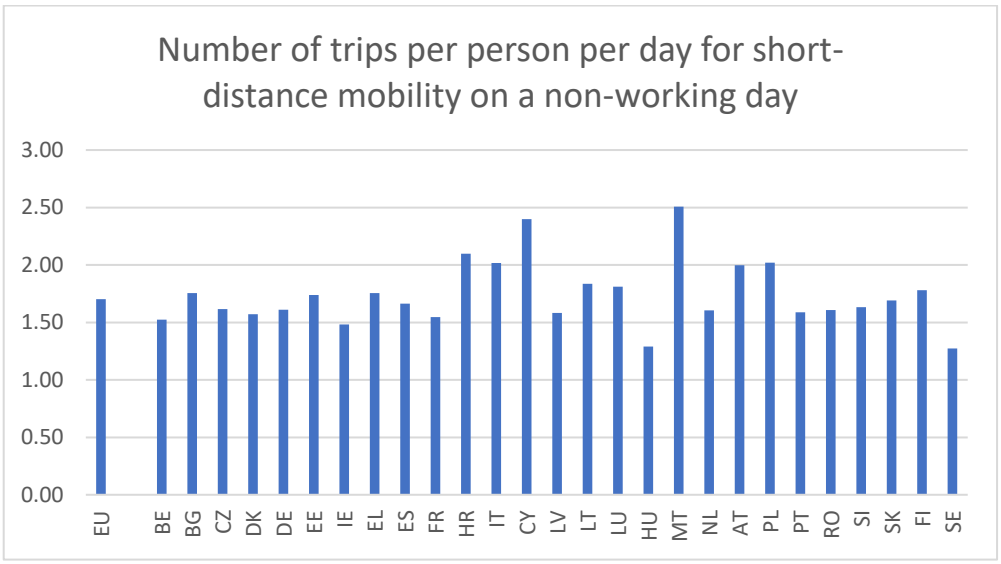
Comparing Figure 13 and Figure 14 against Figure 12, it is evident that the differences between Member States remain relatively constant when the focus is on working vs non-working days. This remains the case even if the average number of trips is higher and even if the average number of trips is lower. The highest rate on a non-working day, is found in Malta, rather than in Cyprus.

Figure 13 - Number of trips per person per day for short-distance mobility on a working day



Source: DG MOVE, European Passenger Mobility Survey, 2022

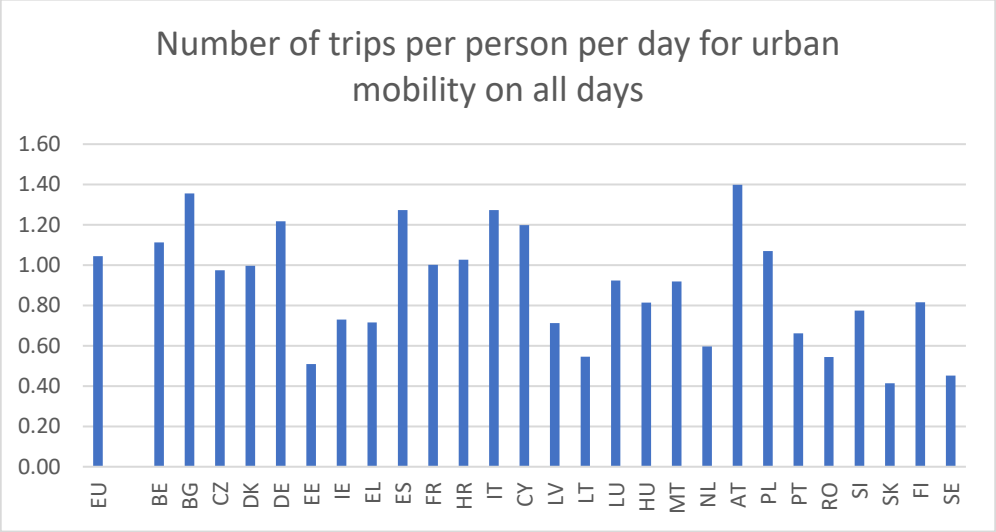
Figure 14 - Number of trips per person per day for short-distance mobility on a non-working day



Source: DG MOVE, European Passenger Mobility Survey, 2022

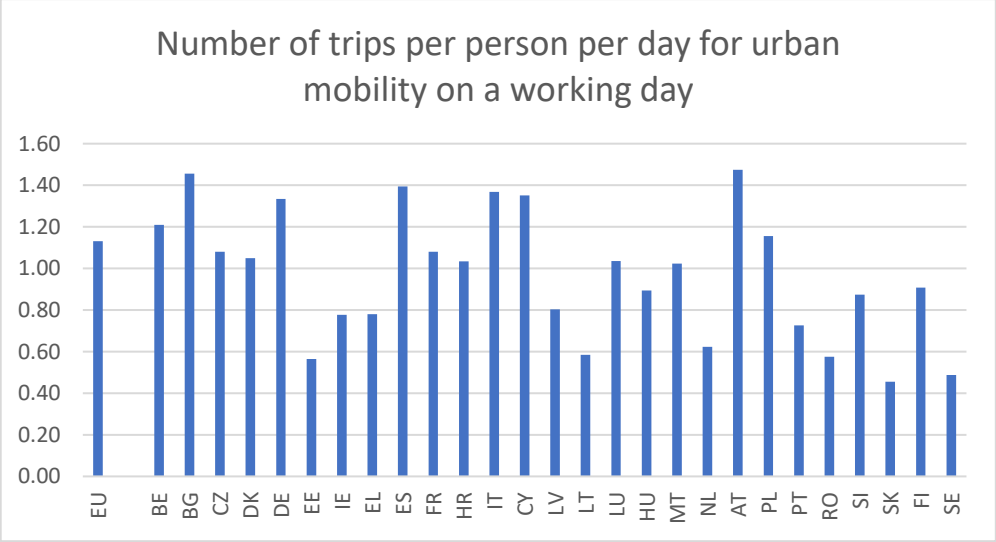
The average number of daily trips differs between Member States also when only urban trips are considered (Figure 15). The differences between Member States remain basically the same when focusing on working and non-working days where the average number of trips is higher and lower respectively (Figure 16 and Figure 17).

Figure 15 - Number of trips per person per day for urban mobility on all days



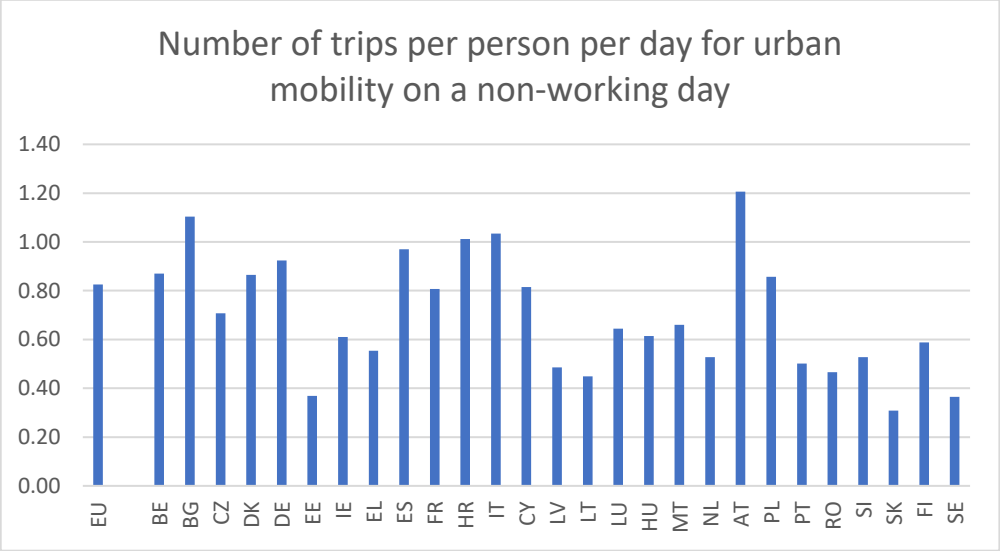
Source: DG MOVE, European Passenger Mobility Survey, 2022

Figure 16 - Number of trips per person per day for urban mobility on a working day



Source: DG MOVE, European Passenger Mobility Survey, 2022

Figure 17 - Number of trips per person per day for urban mobility on a non-working day

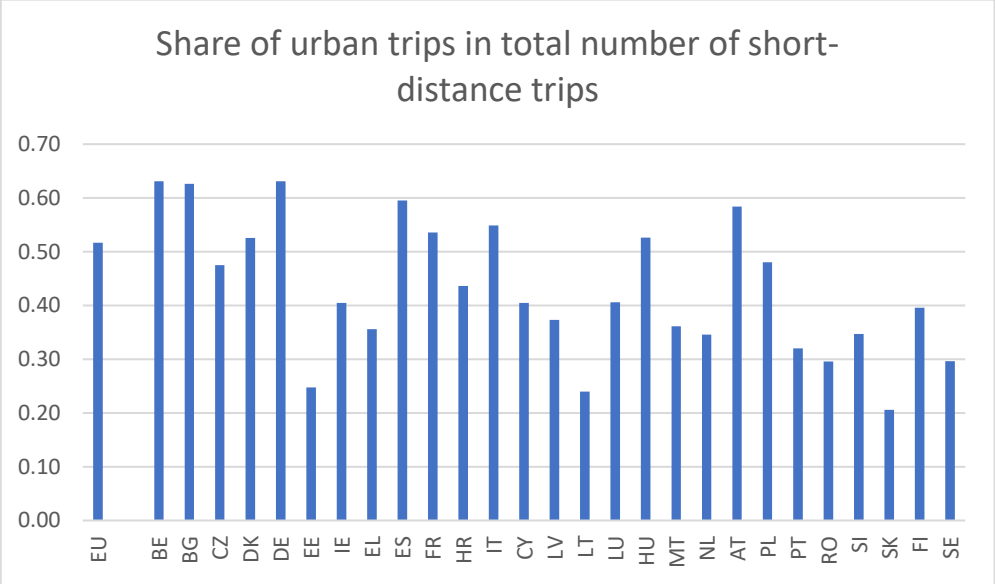


Source: DG MOVE, European Passenger Mobility Survey, 2022

On average in the EU, urban trips comprise slightly more than one half of short-distance trips (Figure 18). This share is close to or higher than 60% in five Member States, namely Austria, Belgium, Bulgaria, Germany and Spain, while it is 30% or lower in five Member States: Estonia, Lithuania, Romania, Slovakia and Sweden. Urban trips are defined as trips below 100 km within the same Functional Urban Area. Given this definition, the daily number of urban trips can be considered as a measure of how many short distance trips occur in the same local area[34].
The share of urban trips remains the same across working days and non-working days, even if the purposes of mobility on working days and non-working days differ (see sections below).

[34] This specification is made to remind the reader that the definition of urban trips is not strictly "trips made within an urban context".

Figure 18 - Share of urban trips in total number of short-distance trips



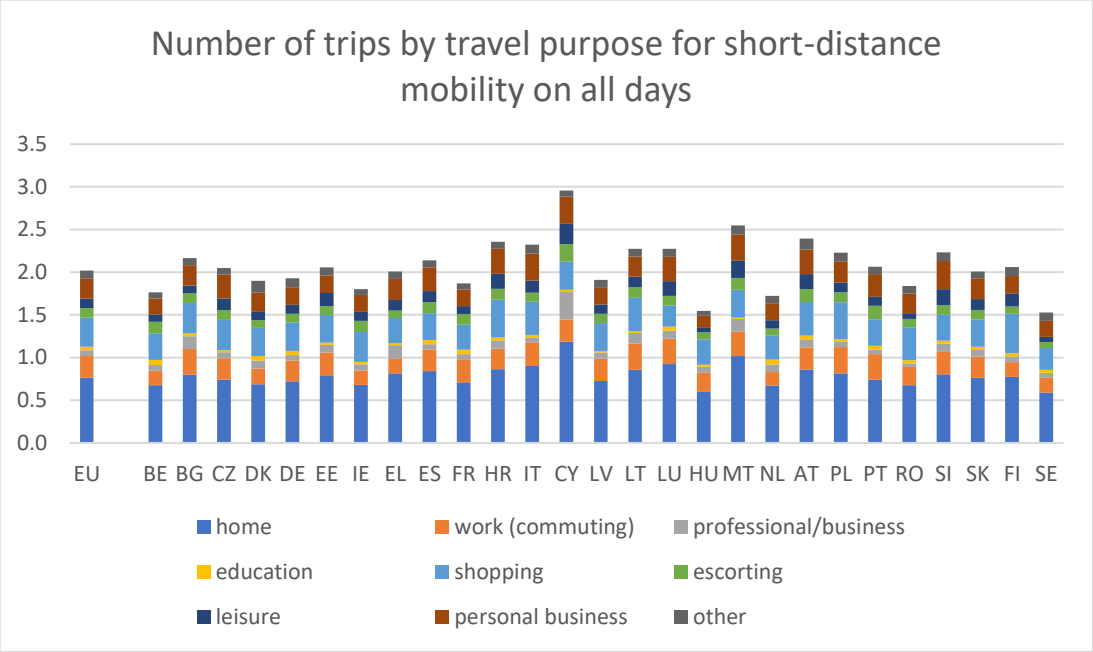
Source: DG MOVE, European Passenger Mobility Survey, 2022

4.2.2.2 NUMBER OF TRIPS BY TRIP PURPOSE

The structure of short-distance trips by purpose on a typical day is very similar in each Member State, with commuting, shopping and other personal business explaining the largest share of mobility (excluding the purpose returning home) (Figure 19).

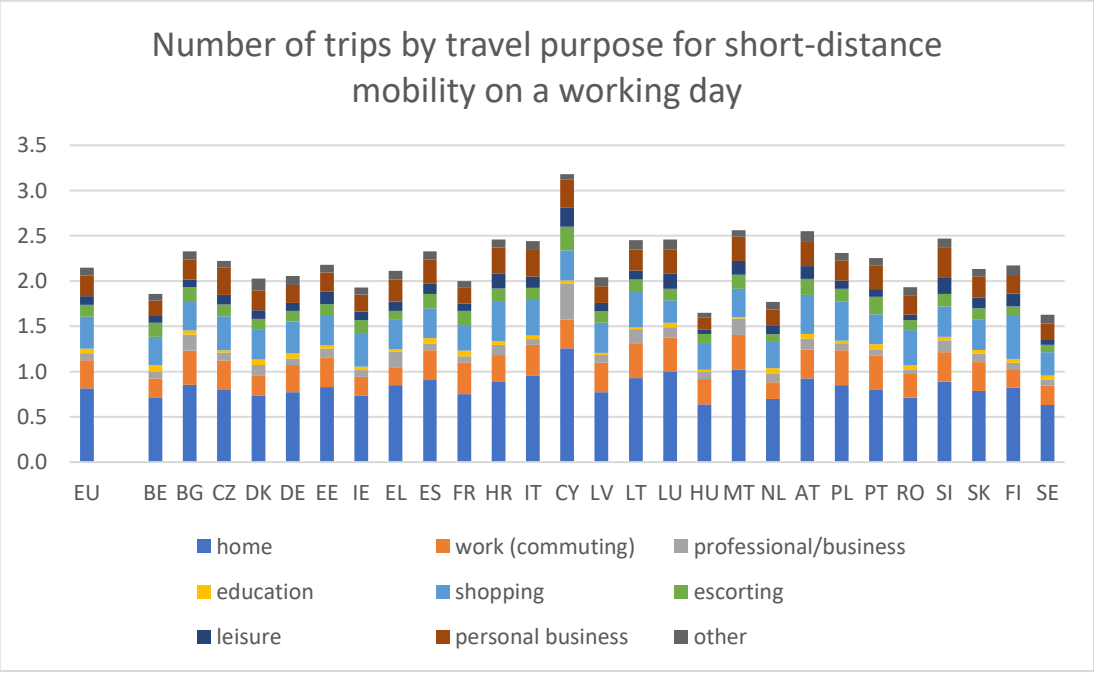
On working days, the share of commuting trips out of total daily trips is higher than on a typical day, as expected, but the difference is not so large (Figure 20). This confirms that even on working days, most of the trips are made for non-working purposes in all Member States. For example, in almost all Member States except Bulgaria, Estonia, Spain, France, Luxembourg, Malta and Portugal, shopping has a higher share than work (commuting) ranging from 0.01 to 0.28. This outcome was likely the result of the pandemic, when teleworking was very widespread. (See Chapter 5). On the other hand, on non-working days the share of commuting, education and professional business trips is significantly lower than on a typical day (but well far from zero) in all Member States (Figure 21). Everywhere, shopping and personal business remain the most relevant trip purposes, with leisure trips also becoming more frequent on non-working days.

Figure 19 - Number of trips by travel purpose for short-distance mobility on all days



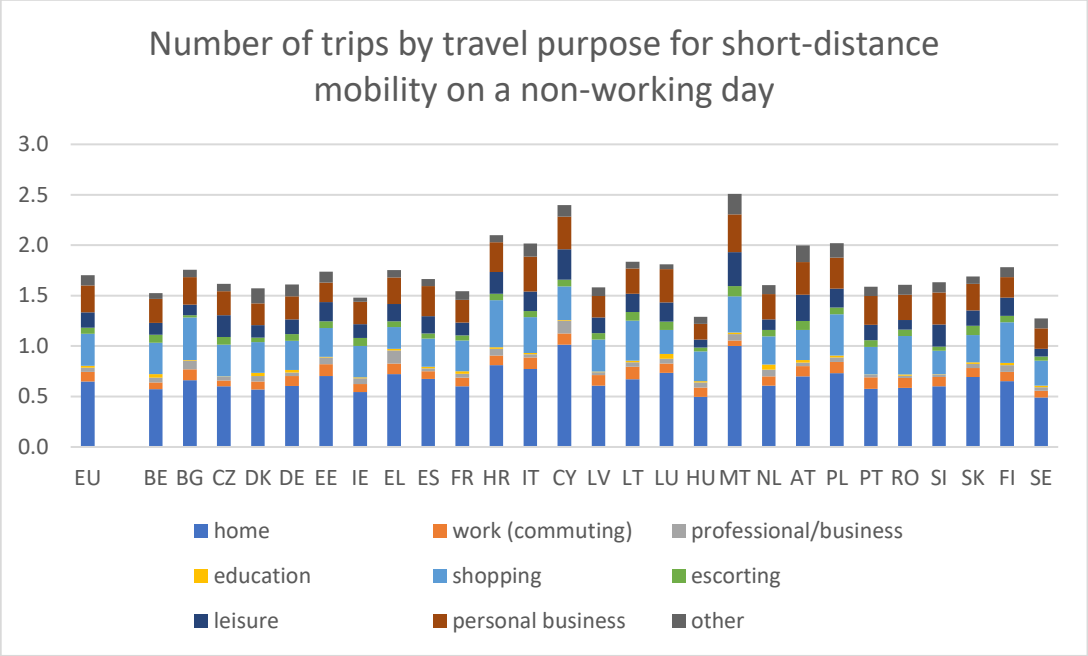
Source: DG MOVE, European Passenger Mobility Survey, 2022

Figure 20 - Number of trips by travel purpose for short-distance mobility on a working day



Source: DG MOVE, European Passenger Mobility Survey, 2022

Figure 21 – Number of trips by travel purpose for short-distance mobility on a non-working day

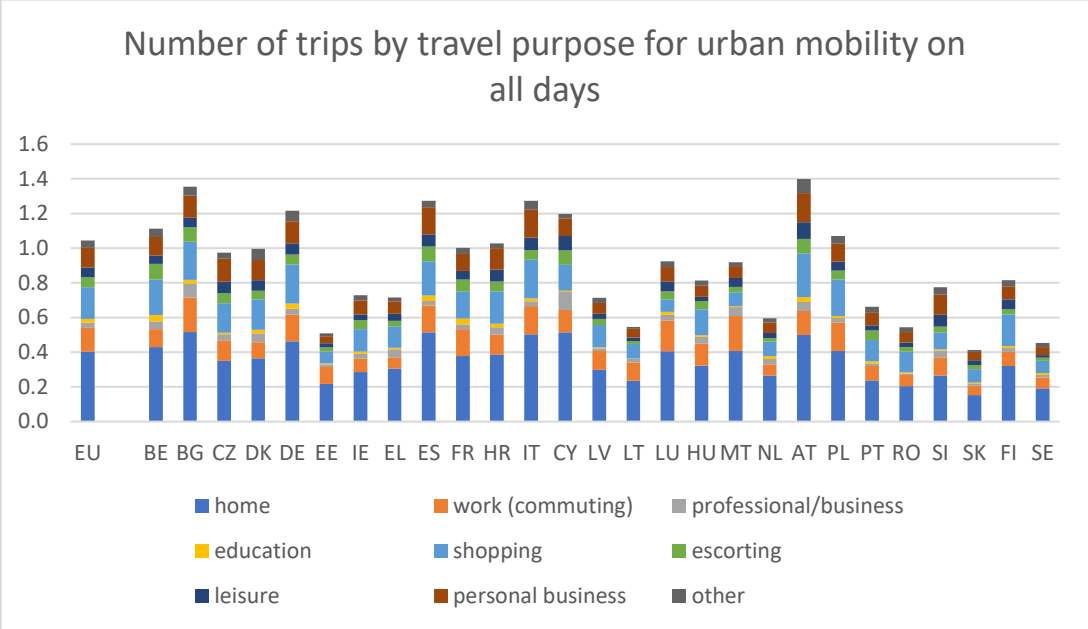


Source: DG MOVE, European Passenger Mobility Survey, 2022

The picture does not change significantly when urban trips are considered (Figure 22). Again, return trips to home are the relative majority, but comprise less than half of the total trips. In all Member States their proportion is similar to what was observed for short-distance trips as a whole. Therefore, the share of non-home-based trips is not significantly higher or lower when urban trips are considered.

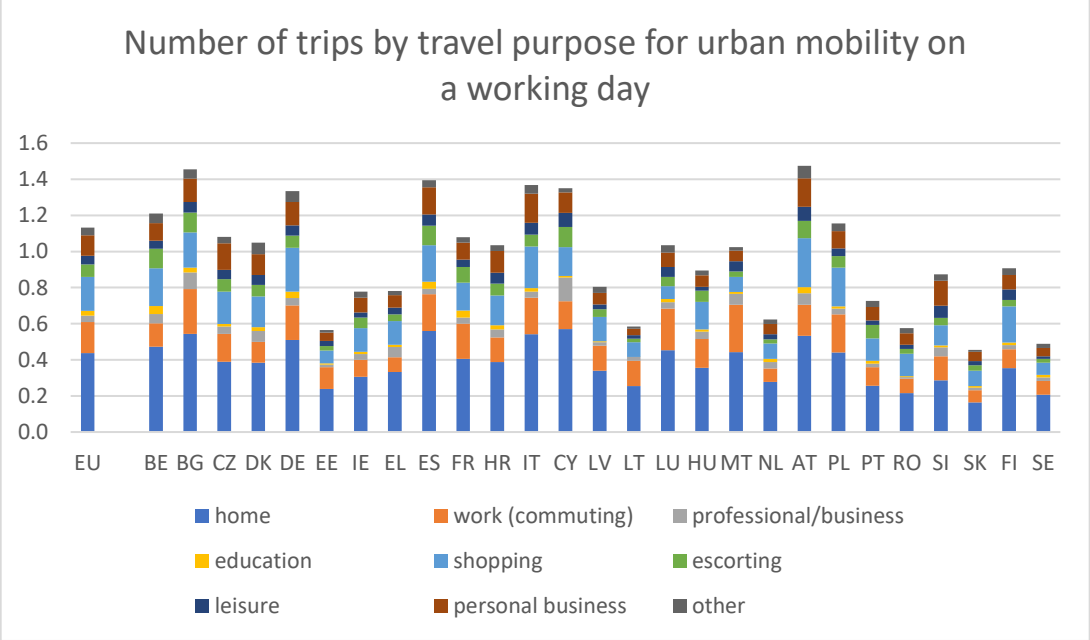
In all Member States, return trips to home are the main purpose when considering urban mobility, regardless of the day. However, the number of trips for home is higher on working days than on non-working days. Commuting for work and shopping are the two main reasons for travelling on a working day, while on a non-working day, leisure and shopping become the main reasons.

Figure 22 - Number of trips by travel purpose for urban mobility on all days



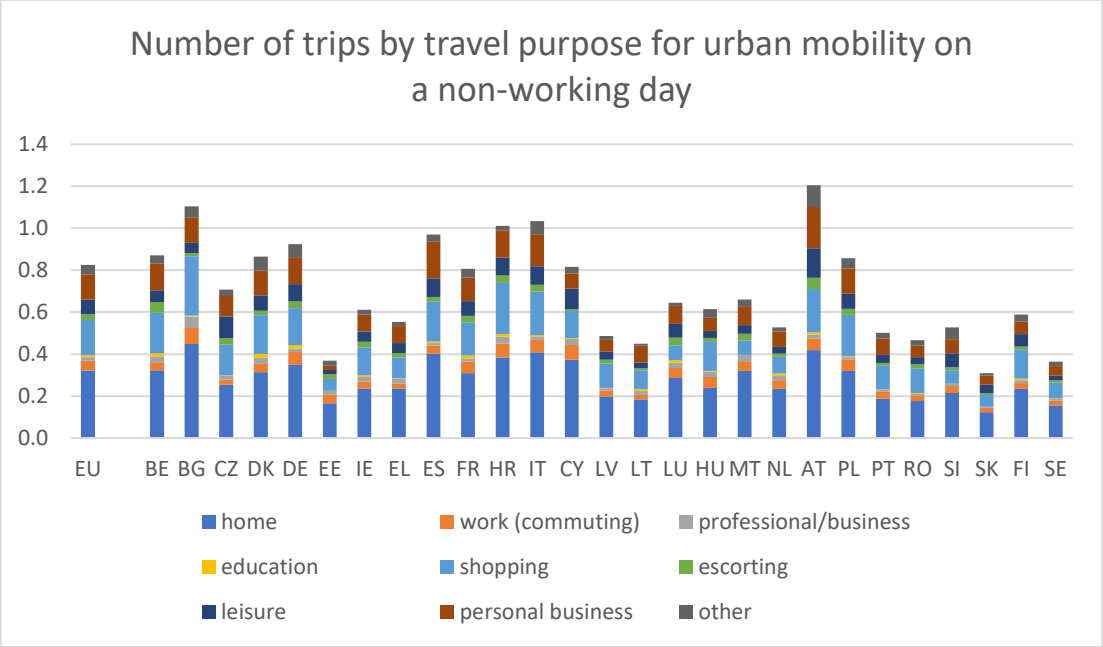
Source: DG MOVE, European Passenger Mobility Survey, 2022

Figure 23 - Number of trips by travel purpose for urban mobility on a working day



Source: DG MOVE, European Passenger Mobility Survey, 2022

Figure 24 – Number of trips by travel purpose for urban mobility on a non-working day



Source: DG MOVE, European Passenger Mobility Survey, 2022

On the other hand, there are slight differences in the overall number of daily trips made between Member States. A more detailed analysis of trips made across specific segments would be necessary to identify additional differences, but fell outside the scope of this report.

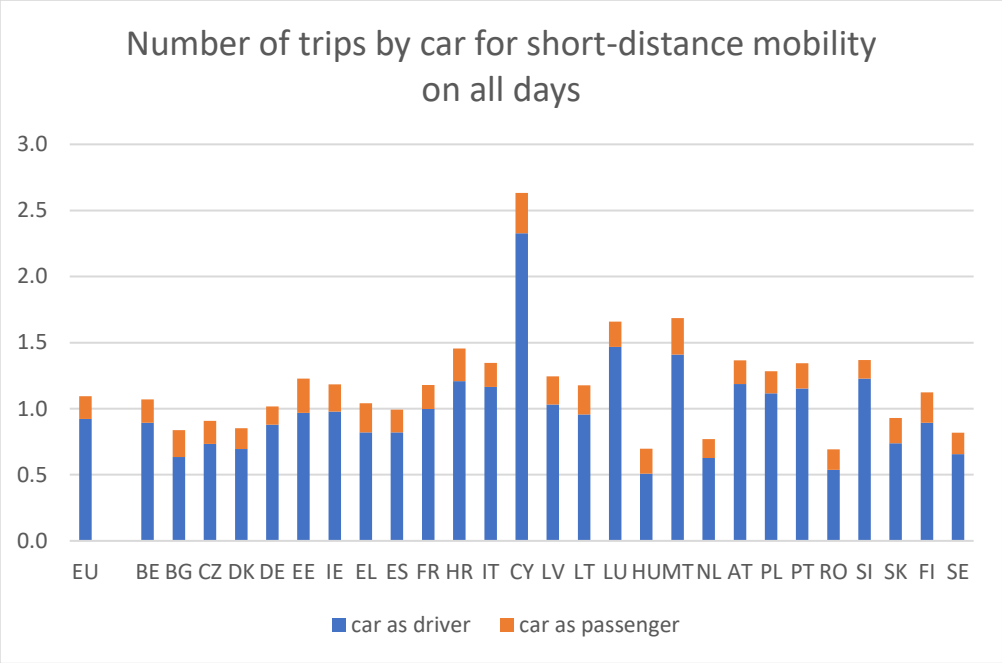
4.2.2.3 NUMBER OF TRIPS BY TRAVEL MODE

When assessing the use of different modes of transport, it is clear that the majority of short-distance trips are made by car in basically all the Member States. Only in Bulgaria and Romania trips made by car were less than 40%, but even in these two Member States, car is the most used mode in relative terms. The modal share of car was found to be consistent with the availability of cars in the household: Member States where this availability is higher, tend to show a modal share of car use above the average and vice versa. Again, this is a correlation rather than a causal relationship; whether the share of car depends on private motorisation or whether private motorisation is the outcome of other aspects leading to the use of car instead of other modes, cannot be said on the basis of these results alone.

It also became clear that the largest part of car trips is made as a driver (Figure 25). The share of trips made as a passenger is around 15% and it is broadly similar in all Member States. In general, the share of trips as passengers is higher in Member States where a lower share of respondents lives in households with three or more cars.

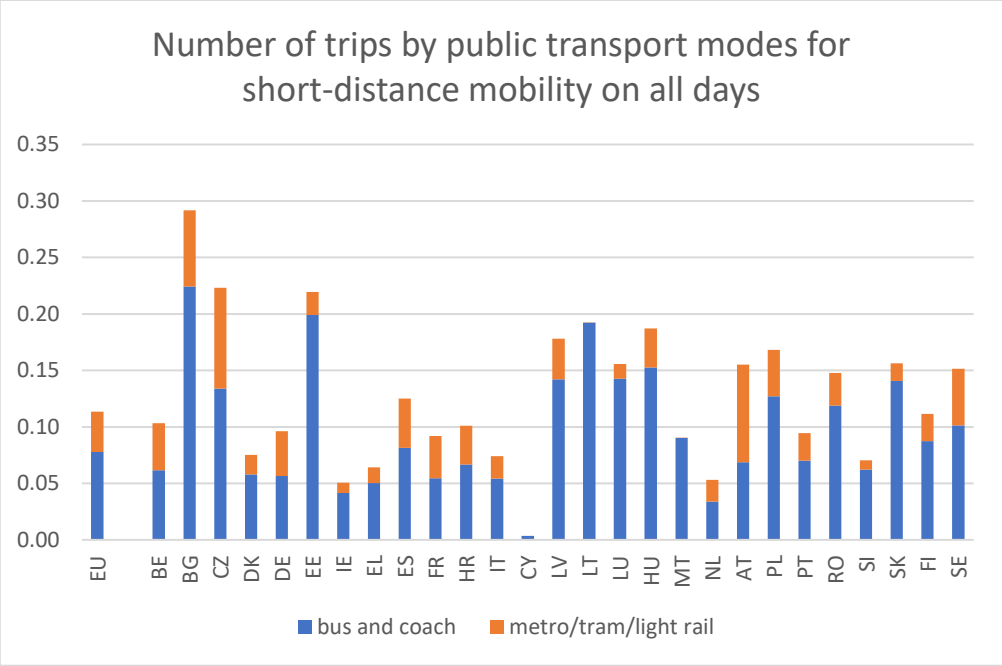
Considering non-car trips, in most Member States the largest share consists of walking trips, the most noticeable exception being the Netherlands, where biking is common. Public transport accounts for a variable share of short-distance trips and very rarely exceeds 10%. Higher shares can be found only in a few Eastern European Member States, where public transport is used, this means mainly bus (Figure 26), with metro, tram and light rail representing a variable share, depending on infrastructure in each Member State.

Figure 25 – Number of car trips (as driver or passenger) for short-distance mobility on all days



Source: DG MOVE, European Passenger Mobility Survey, 2022

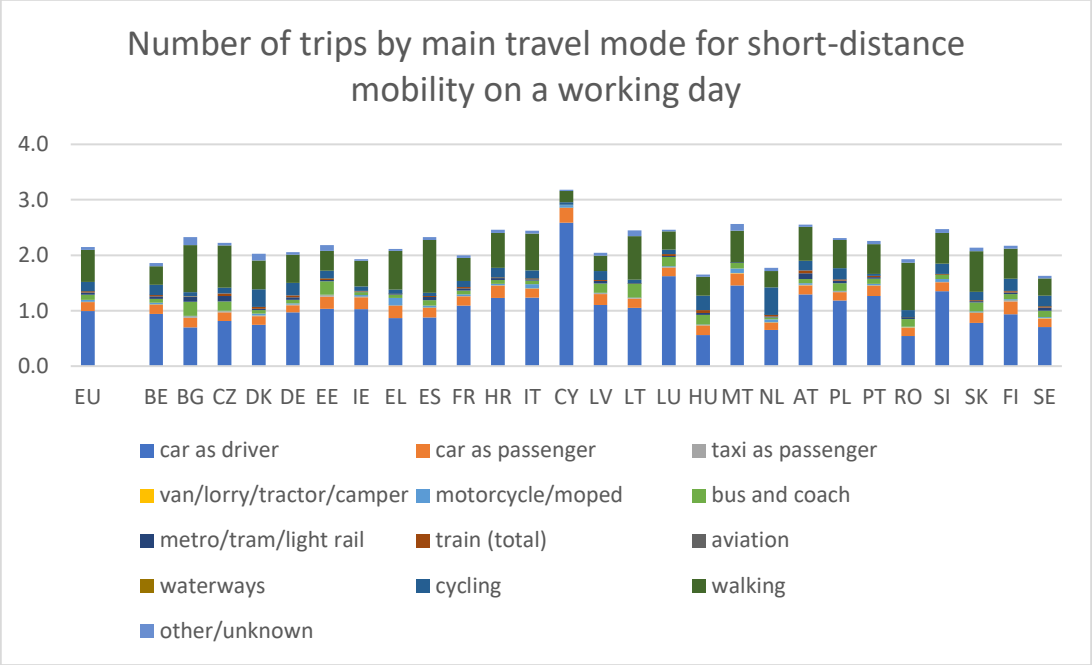
Figure 26 – Number of trips by public transport modes for short-distance mobility on all days



Source: DG MOVE, European Passenger Mobility Survey, 2022

The modal split of short-distance trips made on working days is not significantly different from that on average days and this holds for all Member States (Figure 27).

Figure 27 - Number of trips by main travel mode for short-distance mobility on a working day

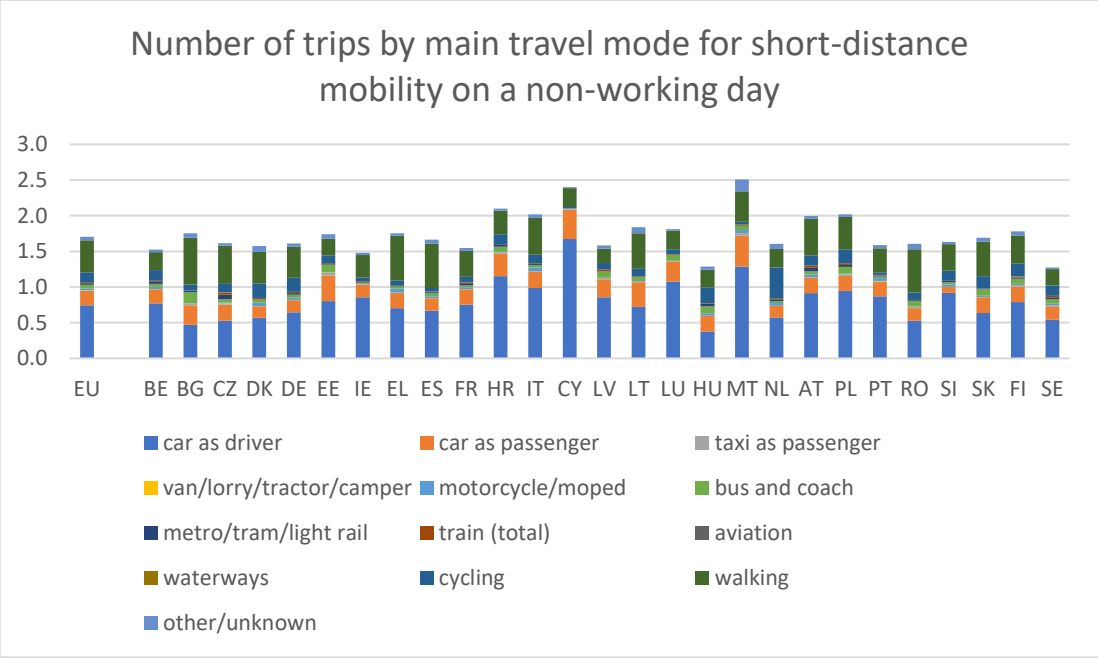


Source: DG MOVE, European Passenger Mobility Survey, 2022

Similarly, in all Member States, it can be observed that for short-distance trips made on non-working days, the mode split is similar to that on the average day. The main difference is that basically everywhere, the role of public transport is lower and there is a somewhat higher share of both walking trips and car trips.

On working days when looking at commuting trips only, differences in the mode shares can be seen in relation to those when the total number of trips is considered. Namely, car and public transport shares are higher than for the total number of trips, while active modes are used less.

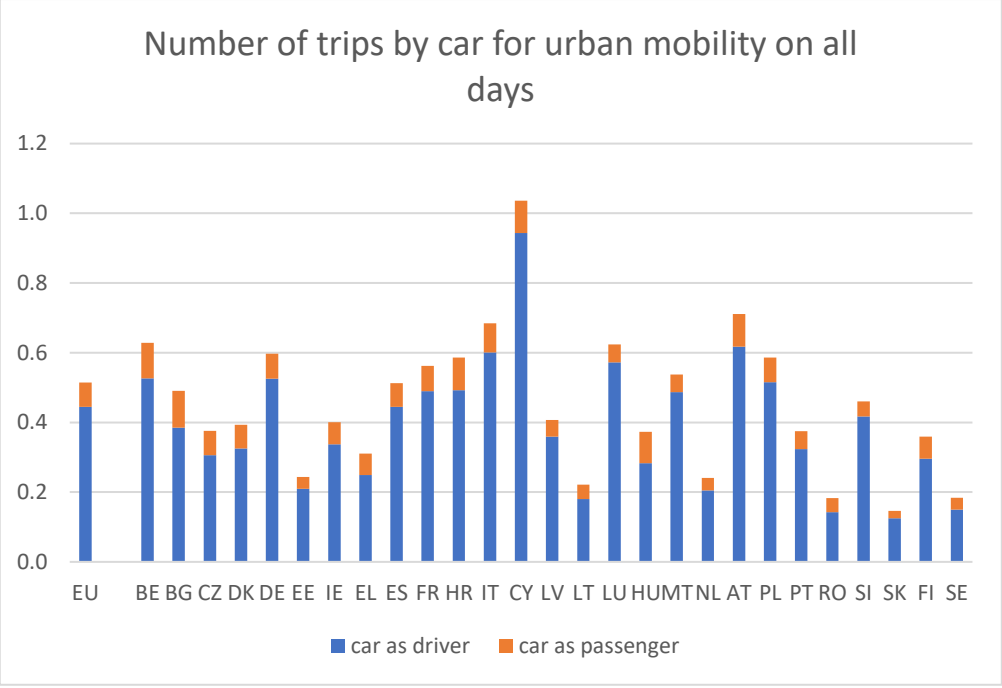
Figure 28 - Number of trips by main travel mode for short-distance mobility on a non-working day



Source: DG MOVE, European Passenger Mobility Survey, 2022

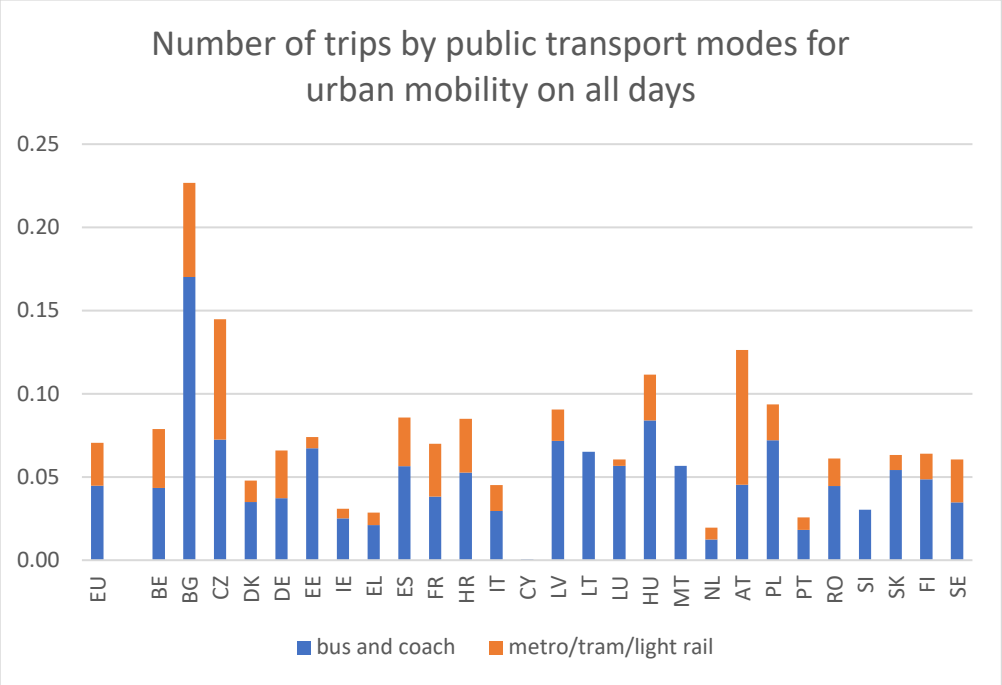
In all Member States, the modal split does not change significantly when the focus is on urban trips on a typical day. Car remains the dominant mode of transport everywhere and most car trips are made as driver, with the proportion of passengers varying slightly across Member State, according to the availability of cars.

Figure 29 - Number of car trips for urban mobility on all days



Source: DG MOVE, European Passenger Mobility Survey, 2022

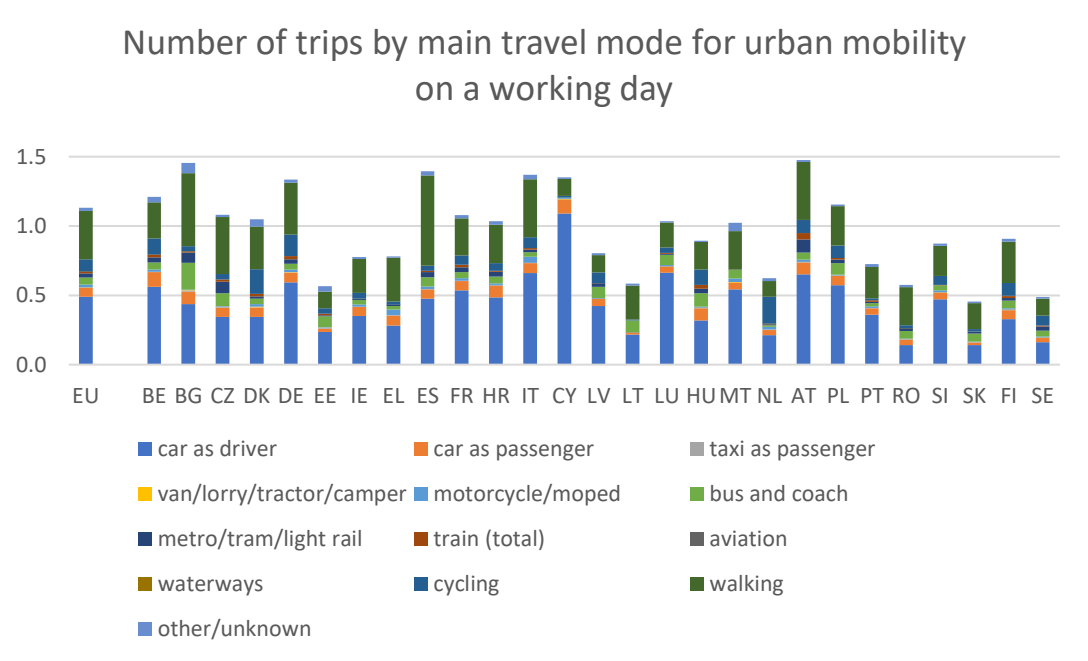
Figure 30 - Number of trips by public transport modes for urban mobility on all days



Source: DG MOVE, European Passenger Mobility Survey, 2022

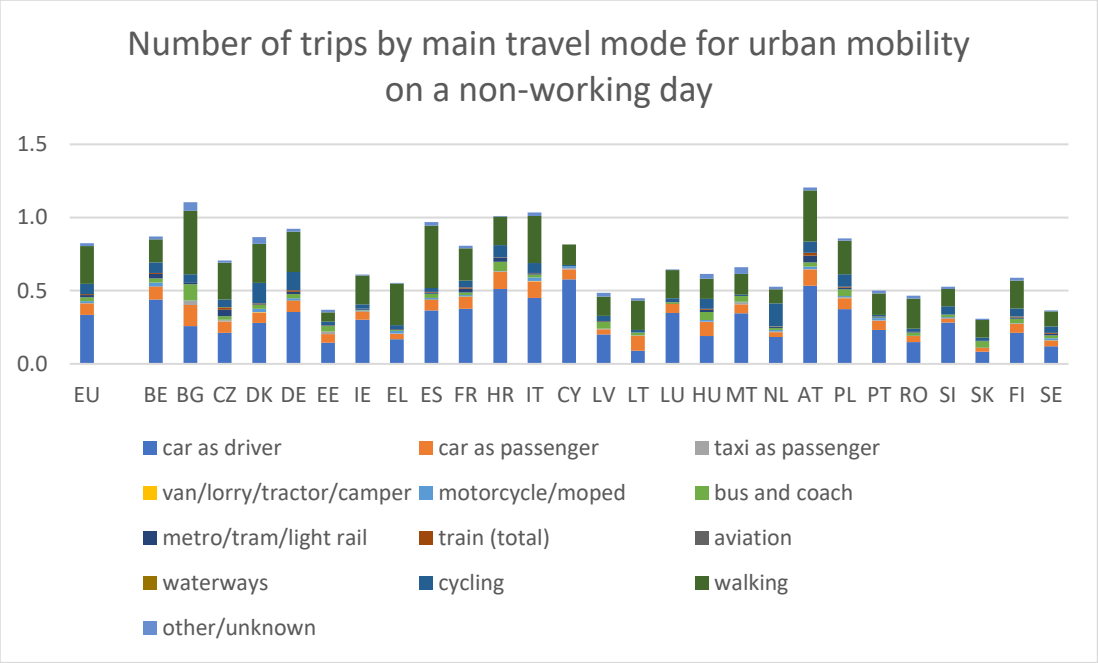
These considerations hold when looking at a working day or a non-working day (Figure 31 and Figure 32). The main travel mode for urban mobility on a working day and non-working day is via car as a driver. On non-working days, walking has a higher share than on working days in all Member States except Belgium, Czech Republic, Estonia, Spain, Croatia, Malta, Portugal, Romania, Slovenia and Slovakia.

Figure 31 - Number of trips by main travel mode for urban mobility on a working day



Source: DG MOVE, European Passenger Mobility Survey, 2022

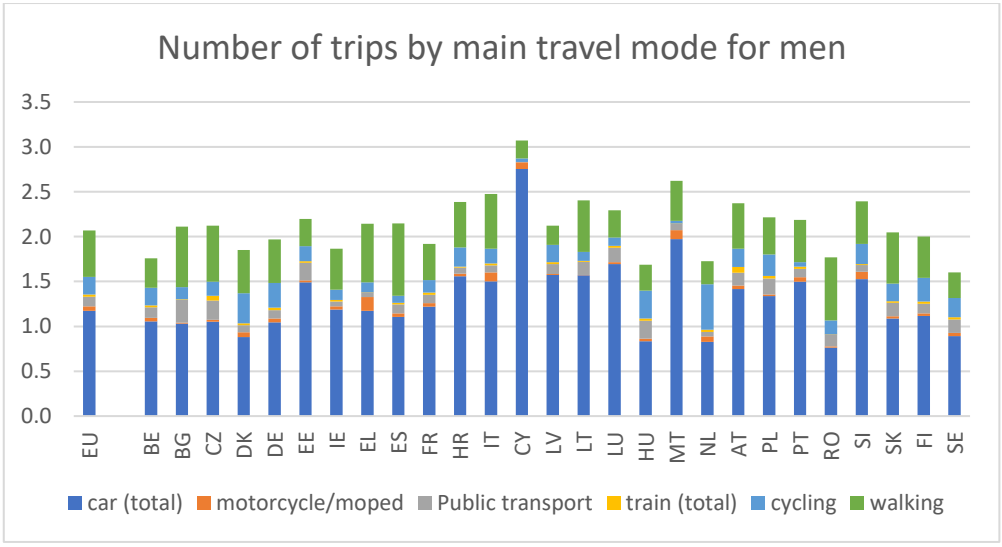
Figure 32 - Number of trips by main travel mode for urban mobility on a non-working day



Source: DG MOVE, European Passenger Mobility Survey, 2022

The share of number of trips is slightly higher among men than women in the EU-27, but car (total)[35] remains dominant in all the Member States. Walking is the second most used mode regardless of the gender, although it is slightly higher among women (Figure 33 and Figure 34).

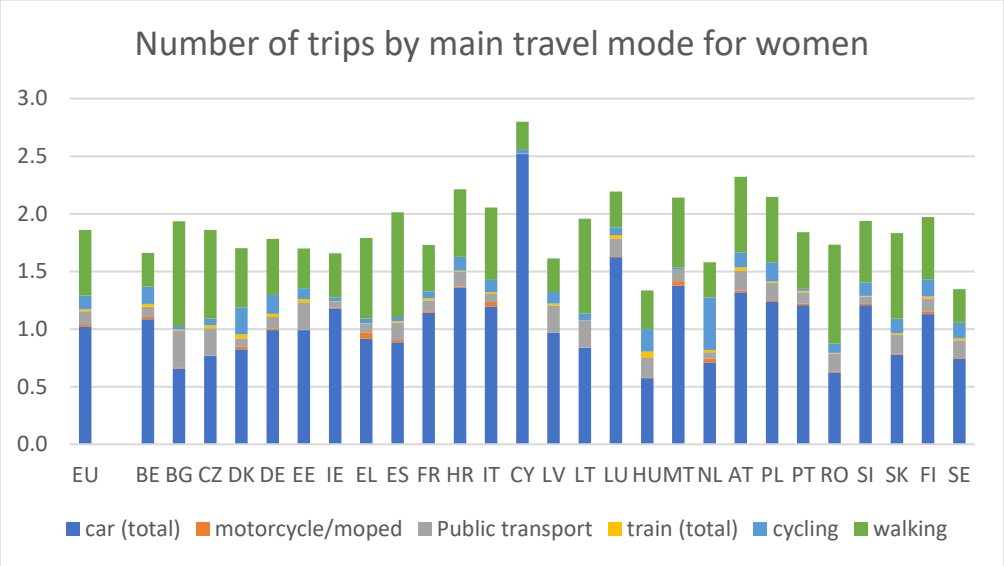
Figure 33 - Number of trips by main travel mode for men



Source: DG MOVE, European Passenger Mobility Survey, 2022

[35] Car (total) includes car as driver and car as passenger.

Figure 34 - Number of trips by main travel mode for women



Source: DG MOVE, European Passenger Mobility Survey, 2022

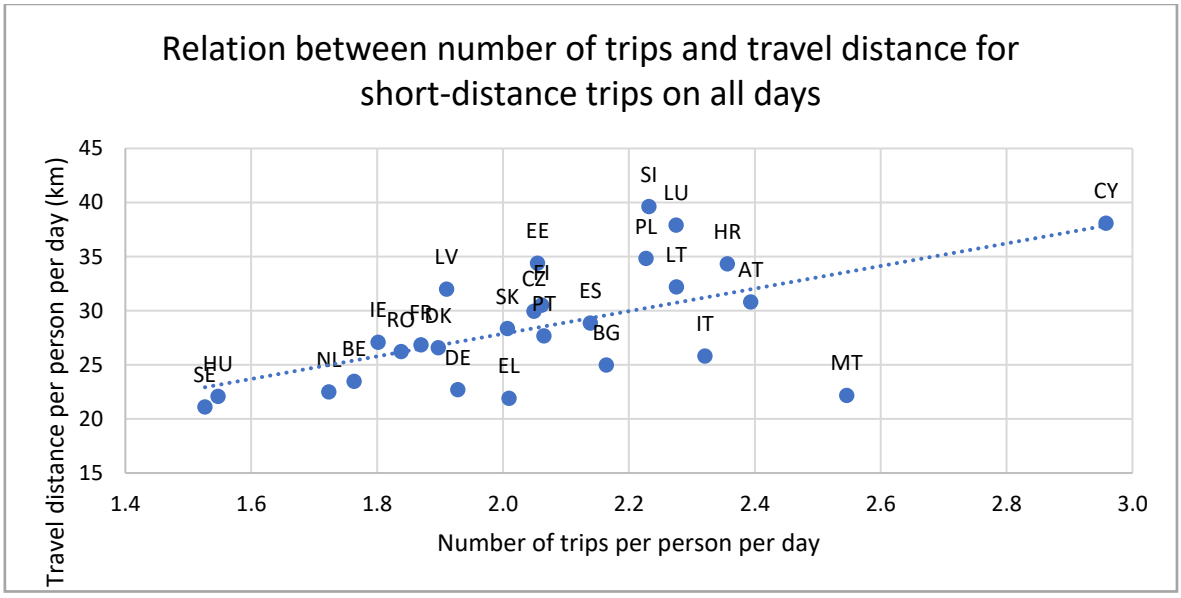
4.2.2.4 TRAVELLED DISTANCE

On a typical day in the EU, individuals travel about 27 km for short-distance trips. In some Member States, namely in Cyprus, Luxembourg and Slovenia, this distance is 40% higher. Belgium, Germany, Greece, Hungary, Malta, Netherlands and Sweden had the lowest distance travelled across the Member States, although in none of the Member States was the average distance travelled daily below 20 km (Figure 36).

Considering the results shown above, a certain level of correlation can be observed between car availability and the average distance travelled. In general, Member States where the average travelled distance is higher also belong to the group of Member States with a higher number of cars available in the household and to the group of Member States where the mode share of cars is higher. However, there are some exceptions; the average distance travelled daily in Czech Republic or Romania, for instance, is above the average, despite these two Member States having a share of car trips which is below the EU average. So, while the data suggests that where there are more cars, individuals tend to travel longer distances (still considering short-distance trips, though), there are other local factors (e.g. population density affecting proximity to trips destinations like workplace, shops, etc.) that play a role. Indeed, Member States where travelled distance is lower, tend to be Member States where the share of urban trips is above the average (Belgium, Germany and Hungary) even if there are some exceptions, like Sweden.

Another interesting result is that the average daily travelled distance does not directly follow from the average number of short-distance daily trips (weak correlation).

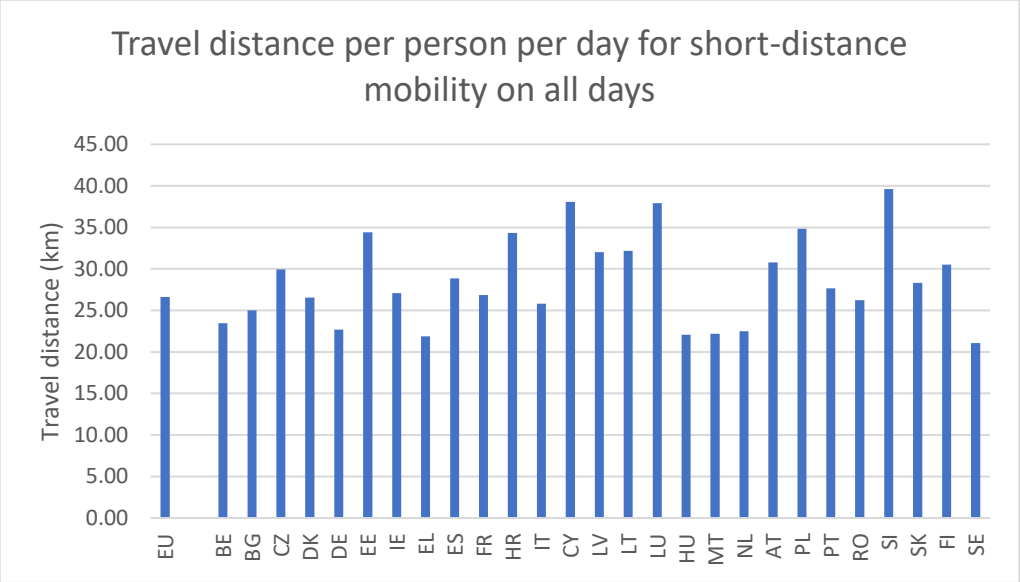
Figure 35 – Linear regression between travel distance (km) and number of trips



Source: DG MOVE, European Passenger Mobility Survey, 2022

While the two elements are correlated – Member States where the number of trips is above the average, generally show a daily distance above the average – there are countries with more trips and shorter daily travelled distance than others. The clearest example is Cyprus, where the average number of short-distance trips is the highest among all EU Member States but the average daily distance travelled is not. The differences between one Member State and another, in terms of distance travelled on a typical day, depends on the number of trips made but also on the average length of these trips.

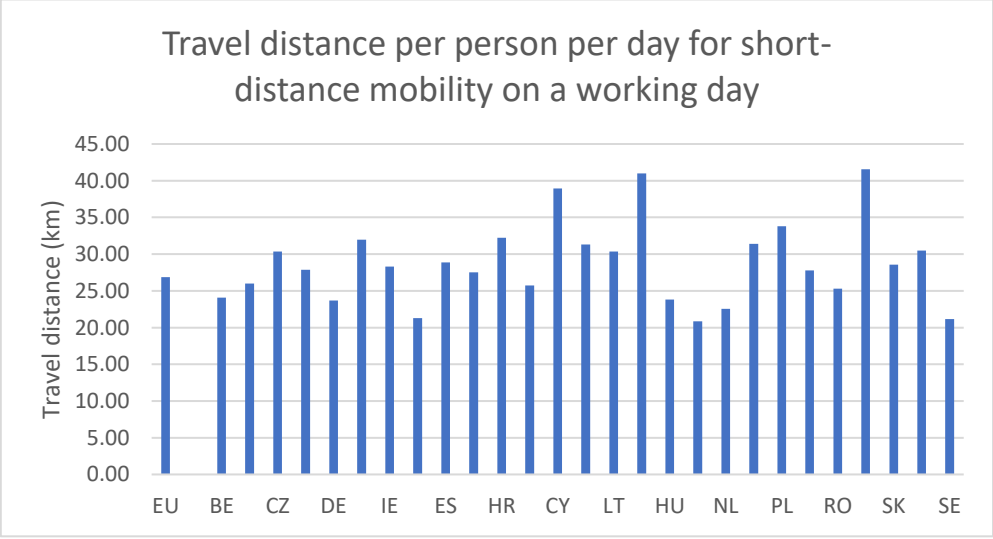
Figure 36 - Travel distance (km) per person per day for short-distance mobility on all days



Source: DG MOVE, European Passenger Mobility Survey, 2022

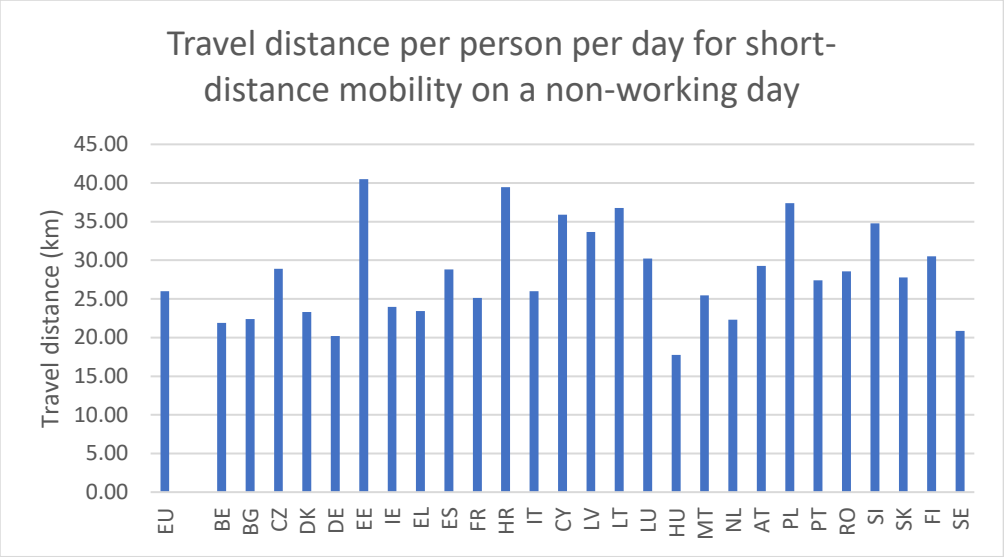
At the EU level, the average daily distance travelled is basically the same on working and non-working days (Figure 37 and Figure 38). However, this does not always hold at Member State level. For instance, in Luxembourg, on working days individuals travel on average some 10 km more than on non-working days. On the contrary, in Croatia, it is on non-working days that average travelled distance is nearly 7 km longer than on working days and in Malta nearly 5 km longer. Smaller differences are found in other Member States.

Figure 37 -Travel distance (km) per person per day for short-distance mobility on a working day



Source: DG MOVE, European Passenger Mobility Survey, 2022

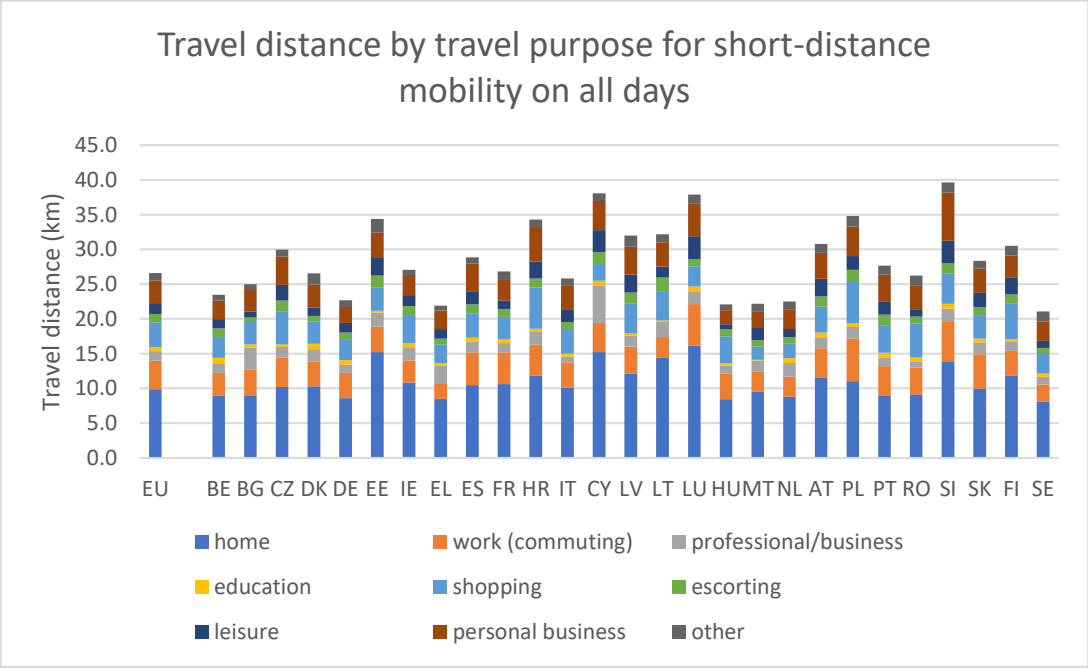
Figure 38 - Travel distance (km) per person per day for short-distance mobility on a non-working day



Source: DG MOVE, European Passenger Mobility Survey, 2022

The distribution of daily travelled distance by trip purpose (Figure 39) reveals that the share of distance travelled for trips to home is generally lower than share of such trips in the total number of trips. This means that their average distance is lower than the average distance of all trips. On the other hand, the share of distance travelled for leisure trips exceeds the share of these trips, i.e. their length is above the average.

Figure 39 - Travel distance (km) by travel purpose for short-distance mobility on all days

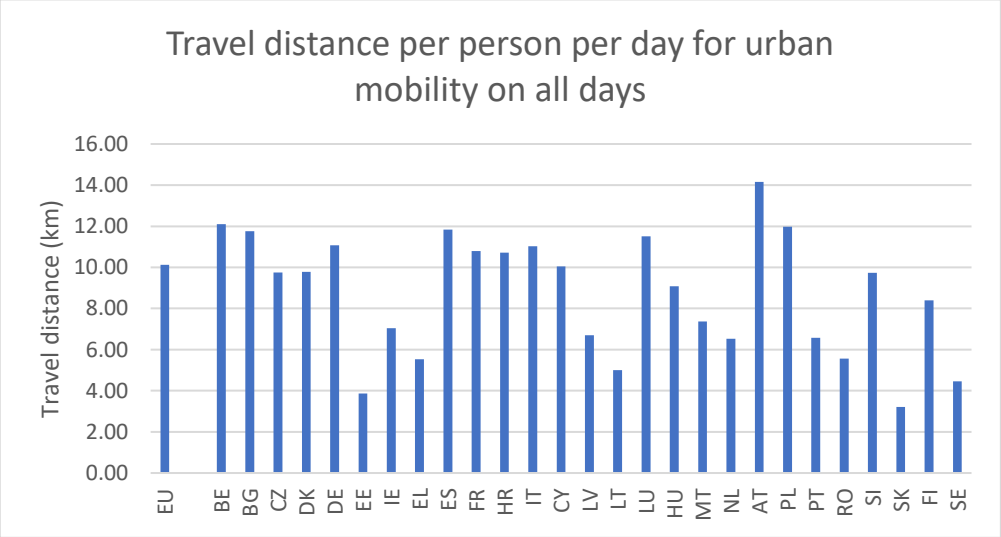


Source: DG MOVE, European Passenger Mobility Survey, 2022

Narrowing the analysis to urban trips, the average distance daily is of course smaller, around 10 km (Figure 40). Again, there are differences between Member States and the ranking is not the same as for short-distance trips. Austria, Belgium, Bulgaria, Spain,

Poland join Luxembourg at the top (some 14 km per day) while in Estonia, Lithuania and Slovakia, less than 5 km per day is travelled for urban trips.

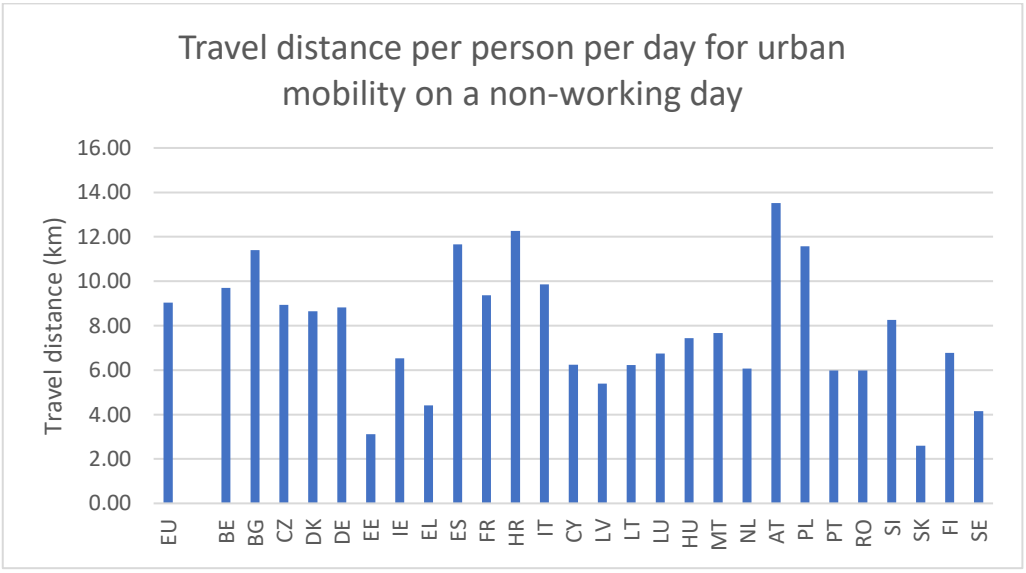
Figure 40 - Travel distance (km) per person per day for urban mobility on all days



Source: DG MOVE, European Passenger Mobility Survey, 2022

The average length of urban trips does not exceed 14 km (Figure 41). It appears that the average travel distance, for all Member States, is higher on working days and lower on non-working days.

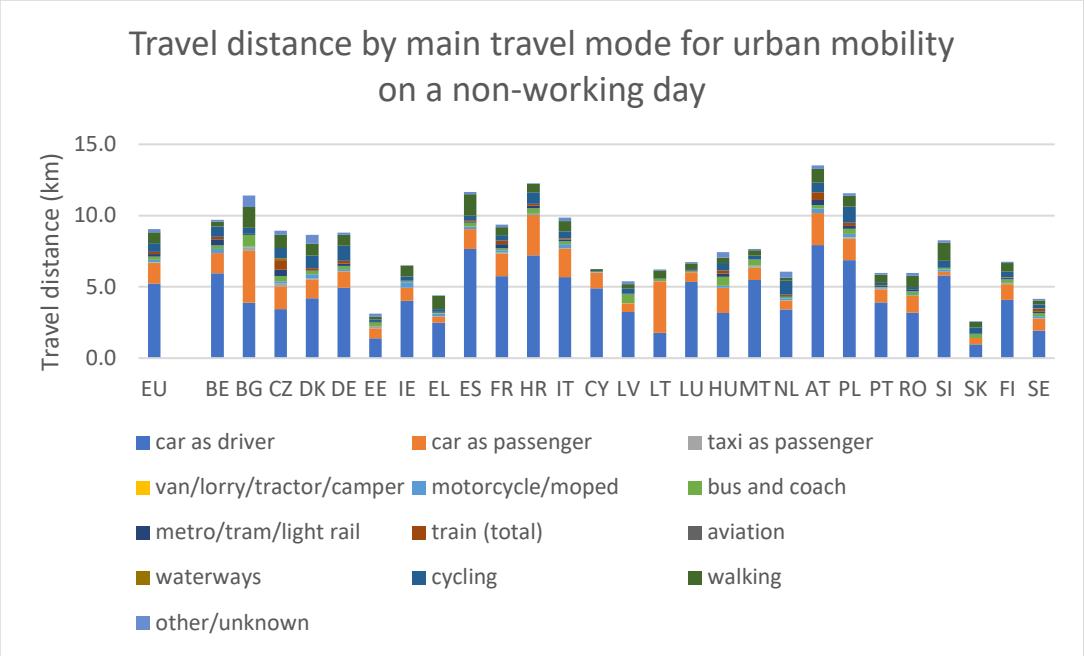
Figure 41 – Travel distance (km) per person per day for urban mobility on a non-working day



Source: DG MOVE, European Passenger Mobility Survey, 2022

At least 30% of the travel distance on non-working day trips is covered by car as driver in almost all the Member States observed except in Lithuania (Figure 42). Car as a passenger is the second most used mode in terms of total distance travelled in nearly all Member States except Slovenia and Greece, where walking is the second highest excluding car as a driver. Bicycles, on the other hand, make up a significant share in the daily distance in the Netherlands.

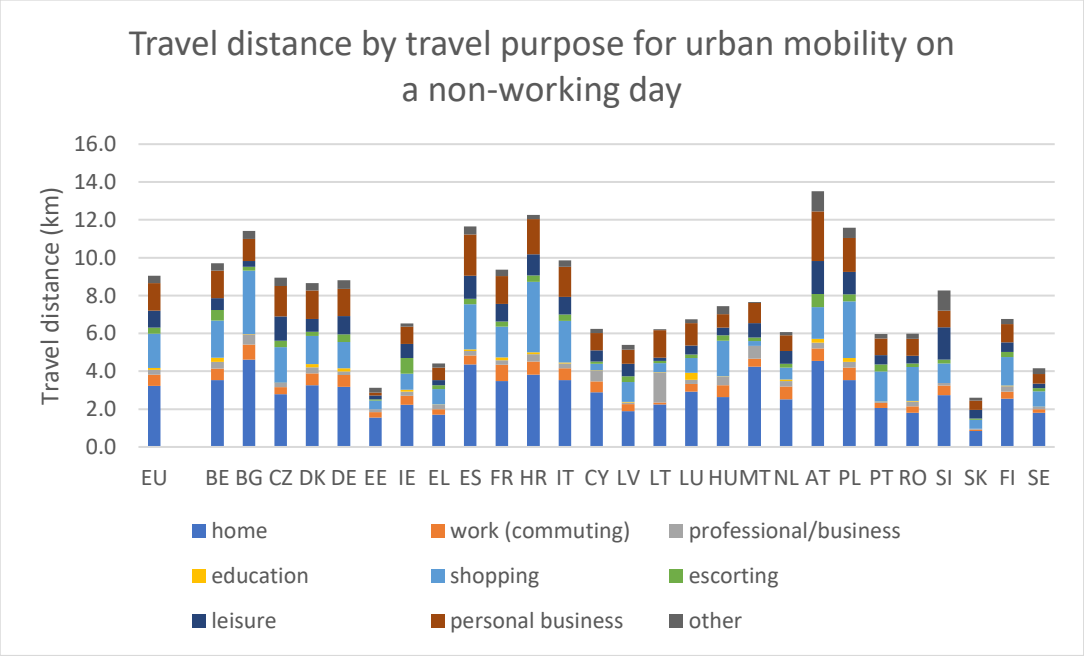
Figure 42 - Travel distance (km) by main travel mode for urban mobility on a non-working day



Source: DG MOVE, European Passenger Mobility Survey, 2022

On a non-working day, the longest distance is covered for 'Home' purposes in all Member States (Figure 43). Surprisingly, Cyprus and Malta cover a comparatively small distance share for 'Shopping' whereas this is relatively high for the other Member States. Overall 'Home', 'Shopping', and 'Personal business' generate the longest daily distances on a non-working day.

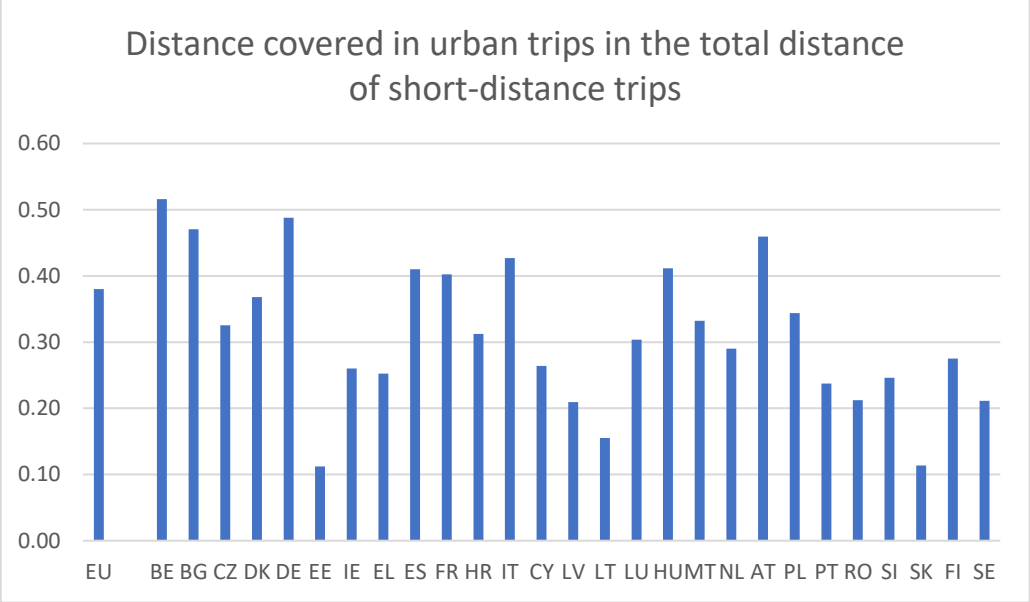
Figure 43 - Travel distance (km) by travel purpose for urban mobility on a non-working day



Source: DG MOVE, European Passenger Mobility Survey, 2022

On average, at the EU level, urban trips represent some 40% of daily travelled distance for short-distance trips (Figure 44). In some Member States, urban trips account for more than 50% of daily travelled distance (e.g. Belgium) while in others they account for less than 20% of this distance (e.g. Estonia, Lithuania, Slovakia). Given the definition of urban trips, these differences can be explained by the number and features of Functional Urban Areas in each Member State: where Functional Urban Areas are more numerous and wider, the share of urban trips – according to the definition used in this study – is larger.

Figure 44 - Distance covered in urban trips in the total distance of short-distance trips



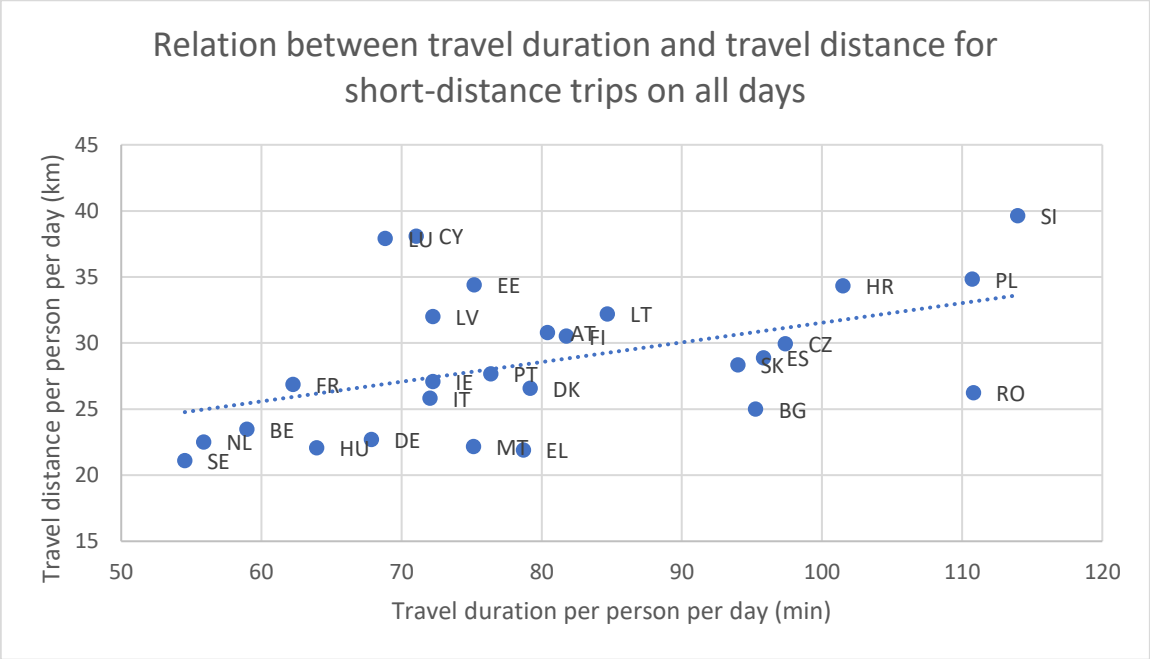
Source: DG MOVE, European Passenger Mobility Survey, 2022

4.2.2.5 TRIP DURATION

On a typical day in the EU, individuals travel for nearly 1 hour and 20 minutes for short-distance trips (Figure 47). This ranges from up to 2 hours travelled on average per day in Poland, Romania and Slovenia, and down to 1 hour travelled per day in Belgium, France, Netherlands and Sweden.

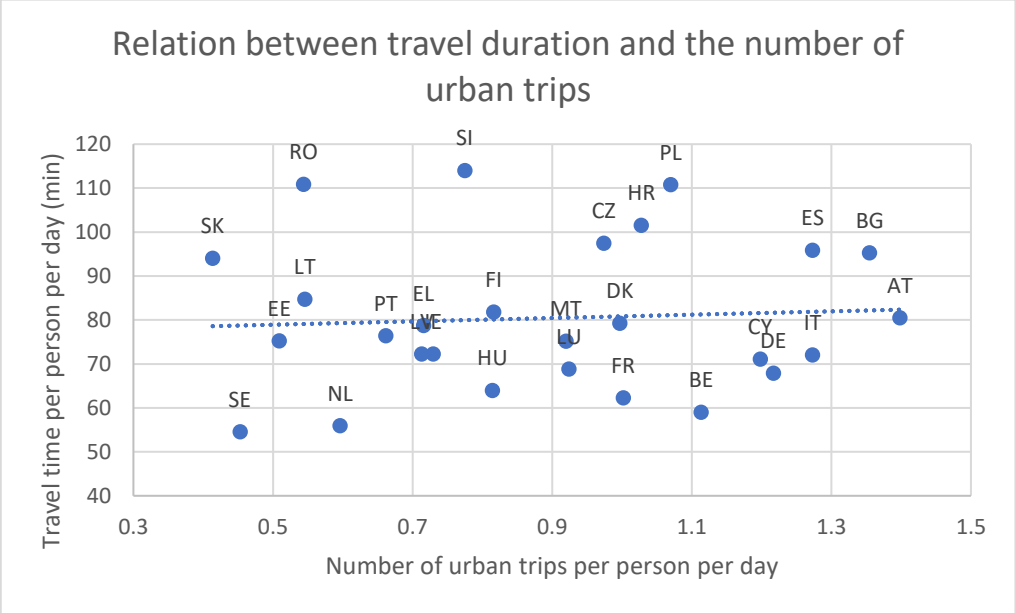
The average duration of short distance trips is broadly correlated to the average length of trips – where daily travelled distance is higher the time spent travelling is also higher. However, this is not observed everywhere. For instance, the average duration of trips in Luxembourg and Cyprus is below the average (around 80 minutes) while the average travelled distance is above the average (around 27 km). This means that the average speed varies across the Member States.

Figure 45 – Linear regression between travel distance (km) and travel duration (min)



Source: DG MOVE, European Passenger Mobility Survey, 2022

Figure 46 – Linear regression between travel duration and the number of urban trips

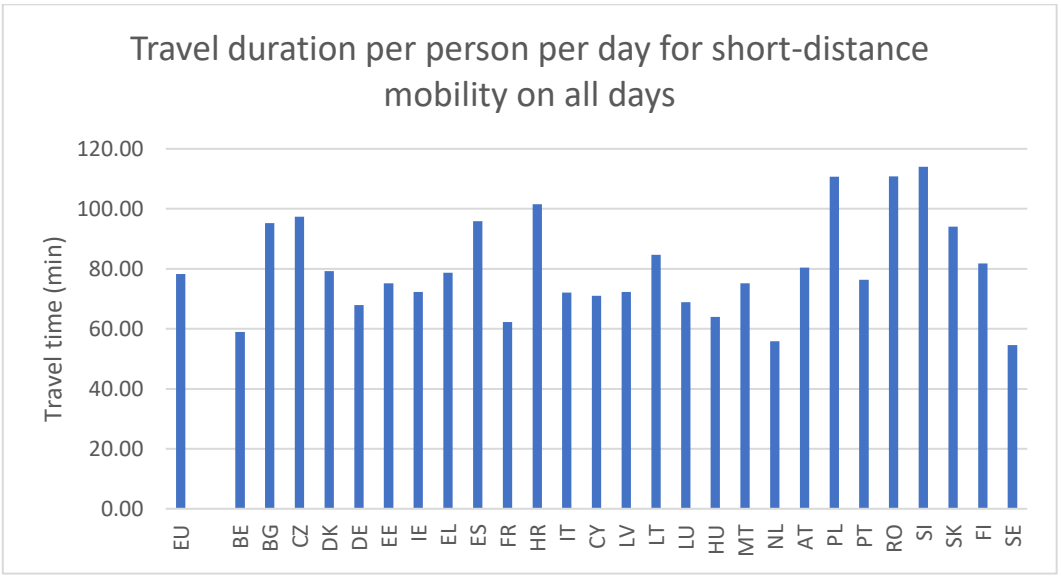


Source: DG MOVE, European Passenger Mobility Survey, 2022

In Figure 46, there is no correlation between the number of urban trips and the travel time of short-distance trips per person per day.

It is noticeable that Member States which have higher durations of daily trips tend to be recently motorised Eastern European Member States, while Member States where the duration of daily trips is lower tend to be found in Central and Northern Europe, where transport and urban planning have been prevalent for several years. This suggests that mobility planning can have tangible effects on travel durations.

Figure 47 - Travel duration (minutes) per person per day for short-distance mobility on all days



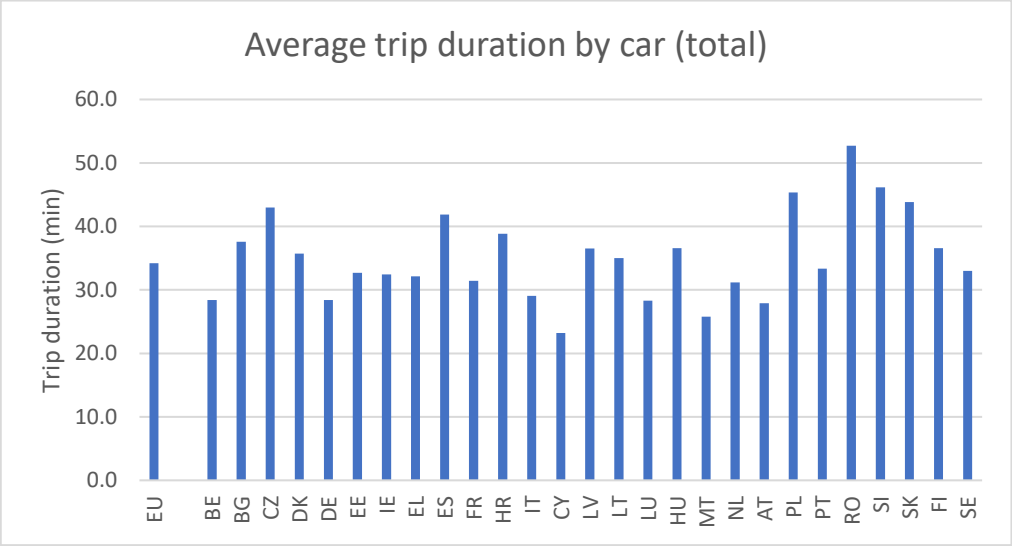
Source: DG MOVE, European Passenger Mobility Survey, 2022

Like travelled distance, the average daily travelled time is not directly linked to the average number of short-distance daily trips. As suggested by the considerations above, not only are the average lengths of trips different in each Member State, there are also

variations in the speed of travel. Charts shown in Figure 48 to Figure 50 provide an overview of this situation for car and public transport trips, showing that both the average duration and the average speed differ.

Regarding travel speeds – as estimated from distance and travel time[36] , it can be noted that, on average, individuals spend 1 hour and 20 minutes travelling for some 27 km (all modes included). One might think that the low average speed depends on the share of trips made by active modes and on the share of trips by public transport especially in urban areas. But even short-distance car trips are not very fast, as their average speed is not much more than 40 km/h across all Member States. Of course, in many circumstances, cars are travelling faster than 40 km/h, but in terms of ratio between distance and time the resulting speed is quite slow. The average speed of public transport is even lower. In both cases, the results of the survey confirm that individuals travel at speeds which are well below the technical potential of motorised transport modes.

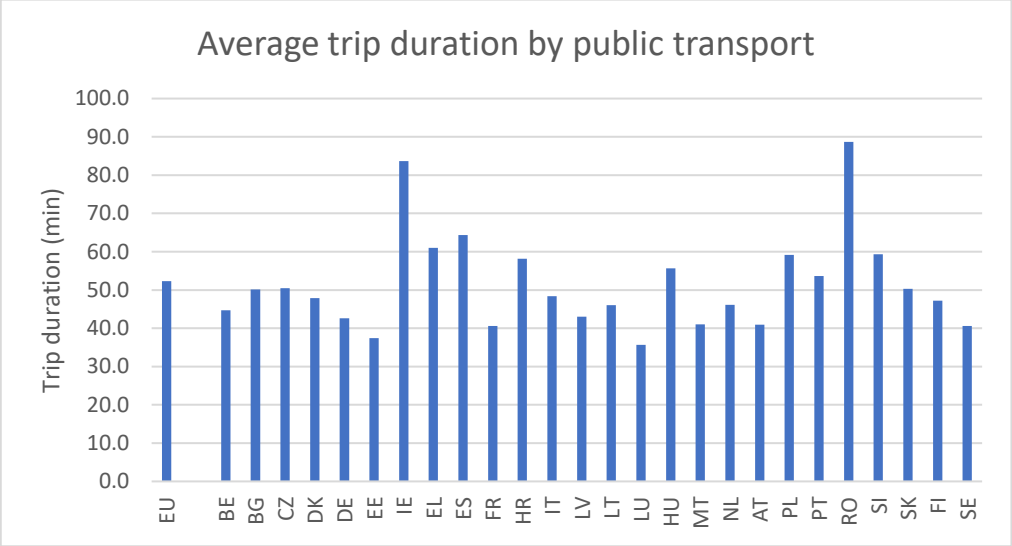
Figure 48 -Average trip duration by car (total)



Source: DG MOVE, European Passenger Mobility Survey, 2022

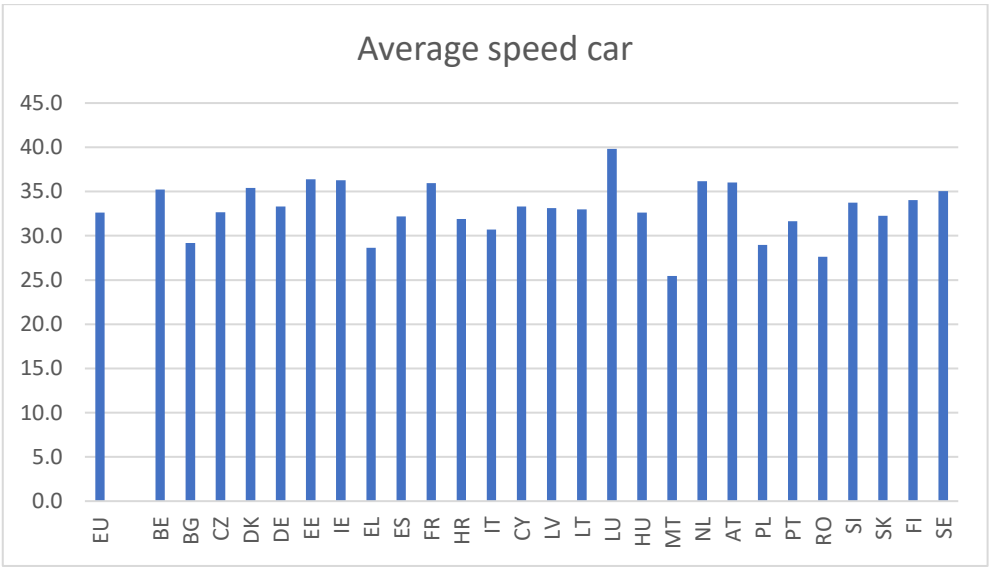
[36] The waiting time is included as the duration of a trip is calculated from the start of the trip to the end of the trip.

Figure 49 -Average trip duration by public transport



Source: DG MOVE, European Passenger Mobility Survey, 2022

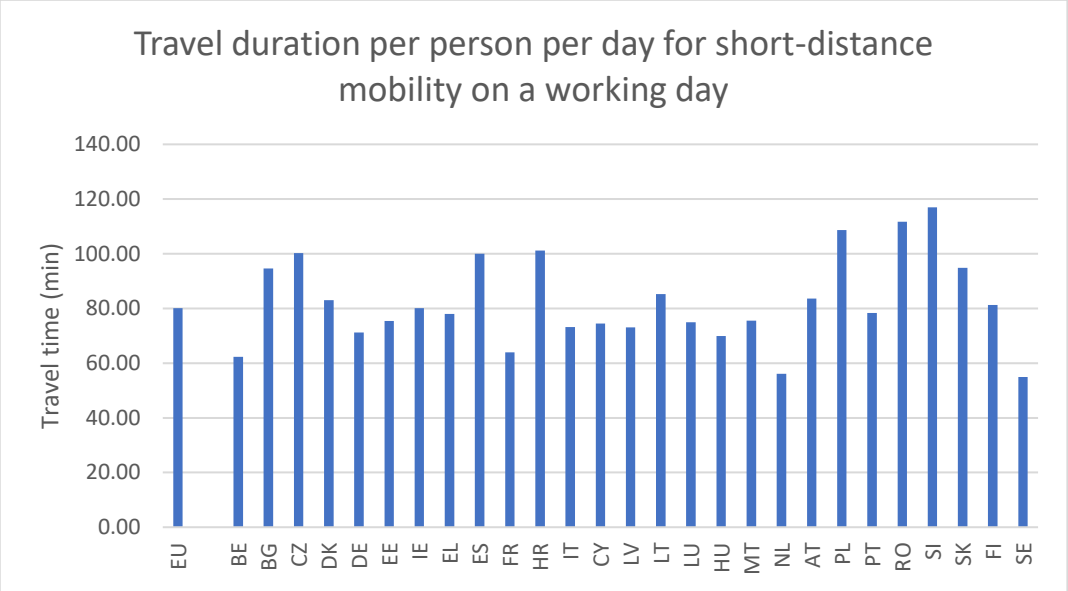
Figure 50 -Average speed for car trips



Source: DG MOVE, European Passenger Mobility Survey, 2022

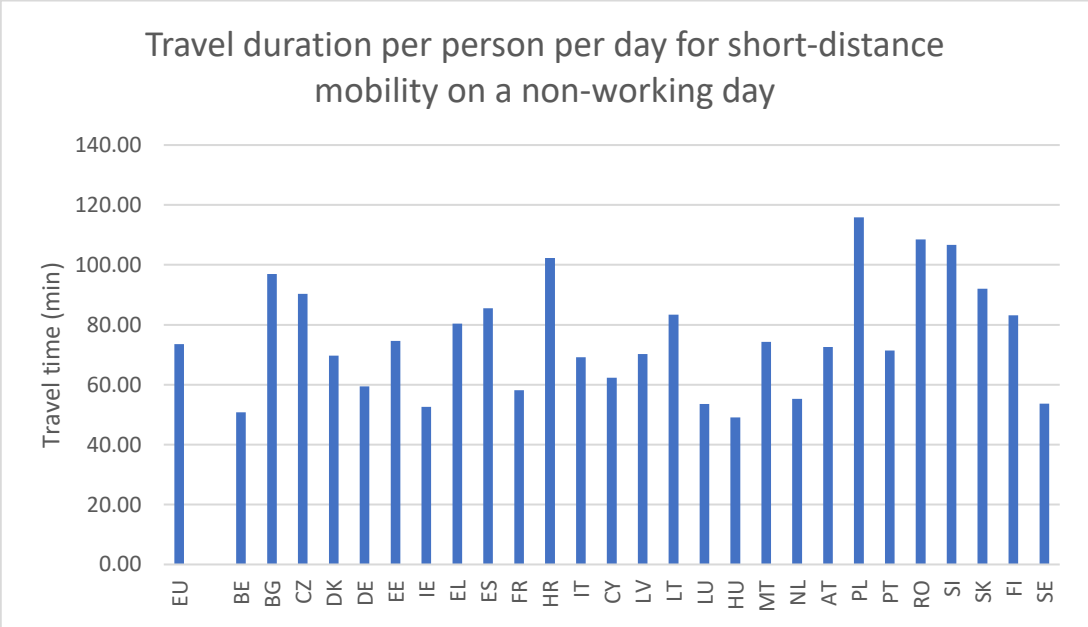
Like travelled distance, at the EU level there is not much difference between travelled time on a working day (Figure 51) and on a non-working day (Figure 52). The latter is slightly shorter, but only by a few minutes. There are some significant differences between Member States, the most evident being Ireland where individuals travel nearly 80 minutes per working day and nearly 52 minutes on non-working days.

Figure 51 - Travel duration (minutes) per person per day for short-distance mobility on a working day



Source: DG MOVE, European Passenger Mobility Survey, 2022

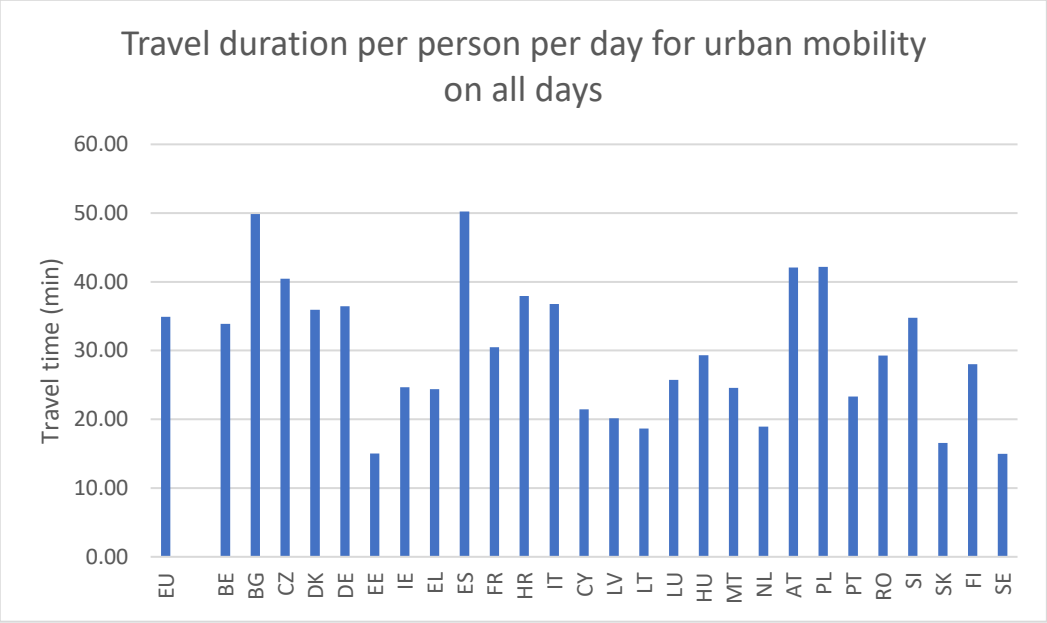
Figure 52 - Travel duration (minutes) per person per day for short-distance mobility on a non-working day



Source: DG MOVE, European Passenger Mobility Survey, 2022

The travel duration for urban trips is on average 35 minutes per day (Figure 53). As the average travelled distance for urban trips is some 10 km, these trips are even slower than other short-distance trips, which is not surprising, especially considering that urban trips include walking trips and (mostly) cycling trips. Differences at the Member State level depend mainly on the share of urban trips in the total short-distance trips.

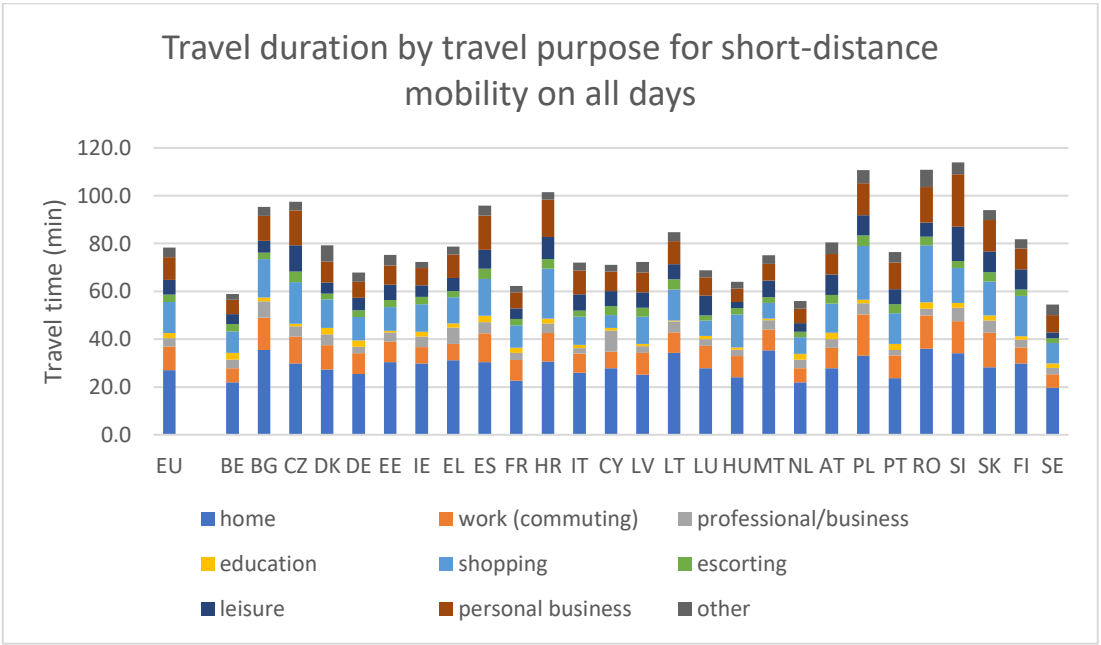
Figure 53 - Travel duration (minutes) per person per day for urban mobility on all days



Source: DG MOVE, European Passenger Mobility Survey, 2022

Across the Member States, the daily time spent travelling per all the various travel purposes is relatively consistent (Figure 54).

Figure 54 - Travel duration (minutes) by travel purpose for short-distance mobility on all days



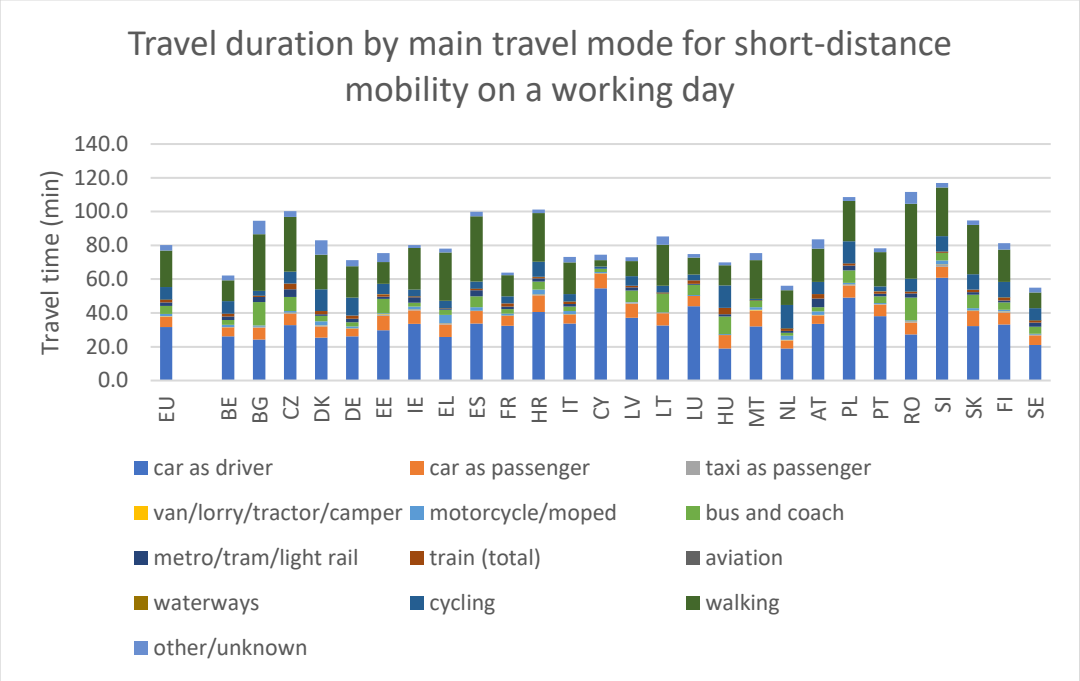
Source: DG MOVE, European Passenger Mobility Survey, 2022

On a working day, driving accounts for over 30% of the travel time in most Member States; the highest proportion being registered in Cyprus. Bulgaria and Romania feature values that are considerably lower, but in turn show the highest shares for bus and coach (Figure 55). The time contributions of other motorised individual travel modes

such as taxis (as passenger), vans, lorries, mopeds and motorcycles are very limited in most Member States.

In Greece and Spain, the daily travel time spent walking amounts to one third of the total trip duration for the day.

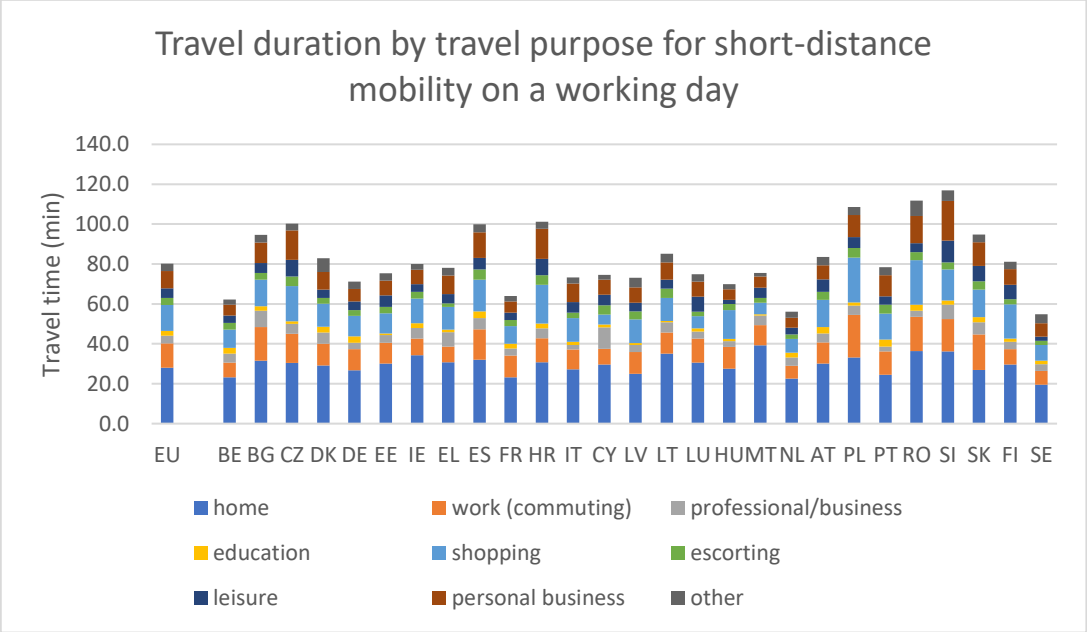
Figure 55 - Travel duration (minutes) by main travel mode for short-distance mobility on a working day



Source: DG MOVE, European Passenger Mobility Survey, 2022

Unsurprisingly, since the number of trips decreased because of the pandemic, 'home' is the significant purpose for the daily travel time (Figure 56), i.e. this purpose has the highest share in terms of number of trips. Combining work (commuting) and shopping, the shares are comparable to the home purpose. In all the Member States, the time for work (commuting) takes a considerably higher share than that for leisure. For all Member States, shopping is a significant purpose for the daily travel time, apart from Cyprus, Malta and Luxembourg.

Figure 56 - Travel duration (minutes) by travel purpose for short-distance mobility on a working day



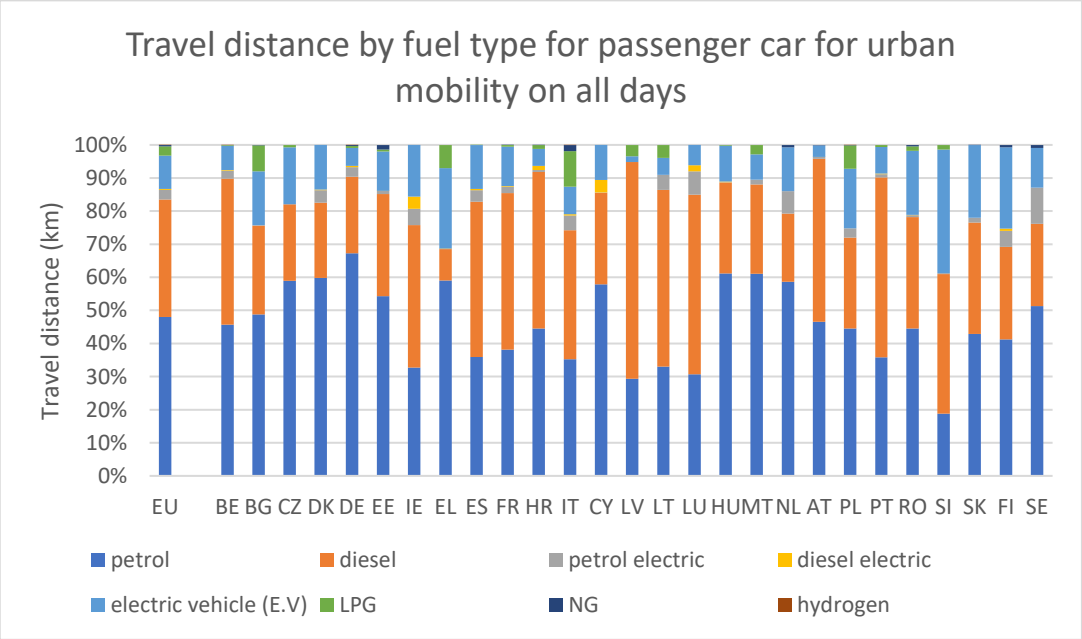
Source: DG MOVE, European Passenger Mobility Survey, 2022

4.2.2.6 FUEL TYPE

There are variations between Member States when it comes to fuel type: for urban mobility, petrol-powered cars are more prevalent in Belgium, Czech, Denmark, Germany and Sweden (see Figure 57). Ireland, Italy, Austria and France, on the other hand, have relatively equal split between petrol and diesel, while Ireland, Cyprus, Luxembourg and Croatia are the only countries having diesel electric vehicles.

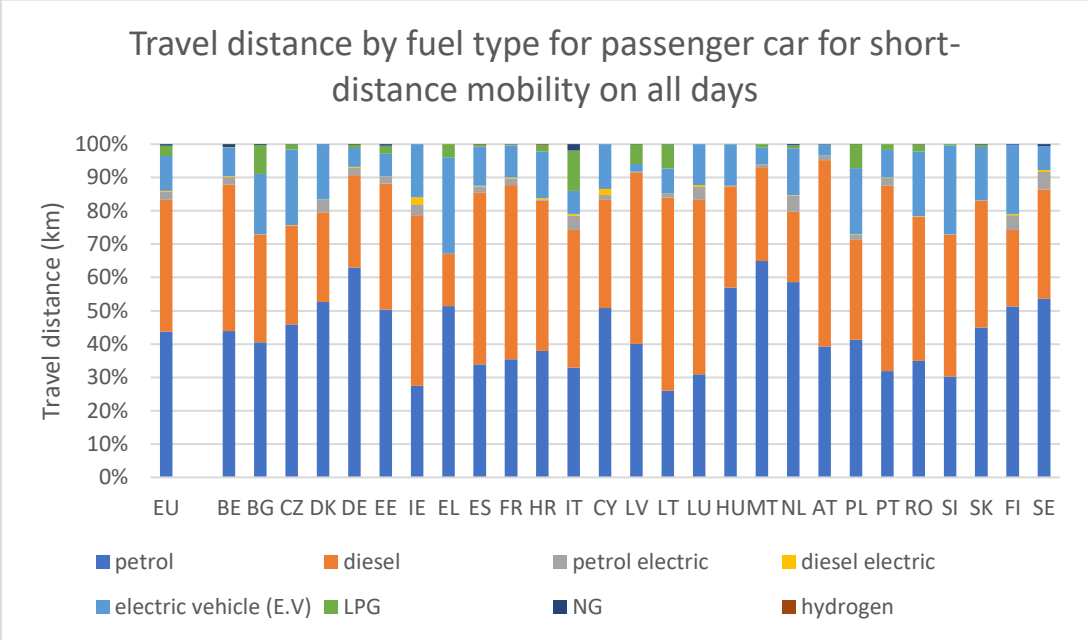
For short-distance mobility on all days (see Figure 58), in almost all Member States people are predominantly using petrol engines, although in Ireland, Spain, France, Croatia, Italy, Latvia, Lithuania, Luxembourg, Austria, Portugal, Romania and Slovenia diesel engines tend to be the most used. Liquefied petroleum gas (LPG) equipped vehicles are relatively important in Italy compared to the other Member States when considering both types of trips (1.7 km for short-distance and 0.6 km for urban trips). For short-distance and urban trips, high shares were observed also for electric vehicles, especially for Greece, Slovenia and Finland. At EU level, 10 % of the distance of urban trips is performed by electric vehicles.

Figure 57 - Travel distance by fuel type for urban mobility on all days



Source: DG MOVE, European Passenger Mobility Survey, 2022

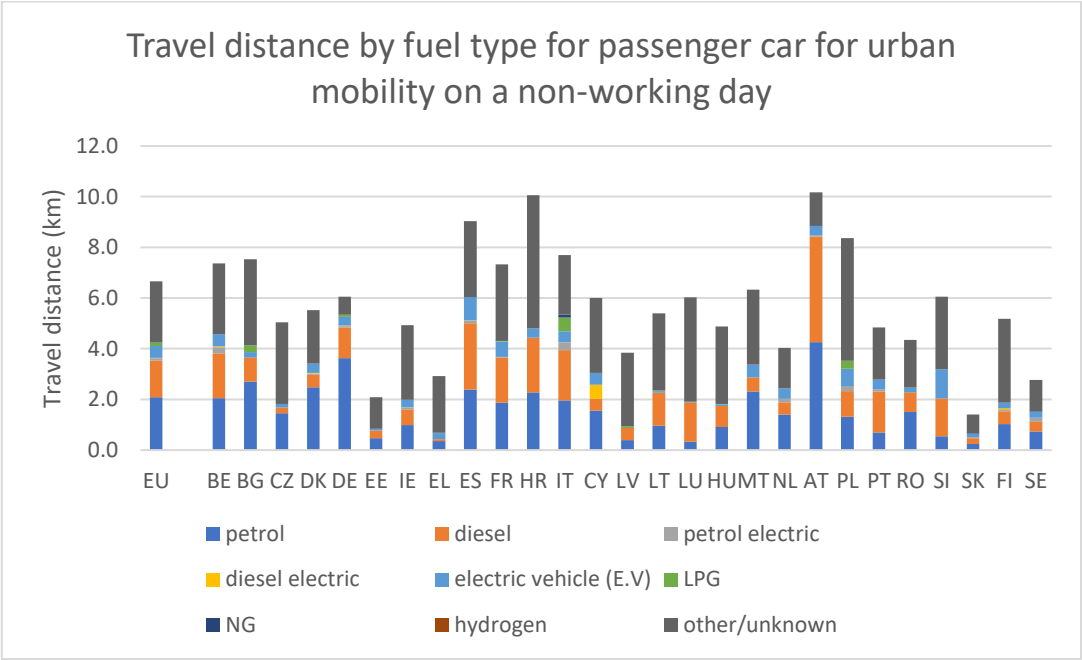
Figure 58 - Travel distance by fuel type for short-distance mobility on all days



Source: DG MOVE, European Passenger Mobility Survey, 2022

Spain and Austria show an equal split between petrol and diesel-fuelled cars, whereas in Lithuania a diesel engine is clearly dominant (Figure 59). In all other Member States, the most dominant fuel type is unknown.

Figure 59 - Travel distance by fuel type for urban mobility on a non-working day

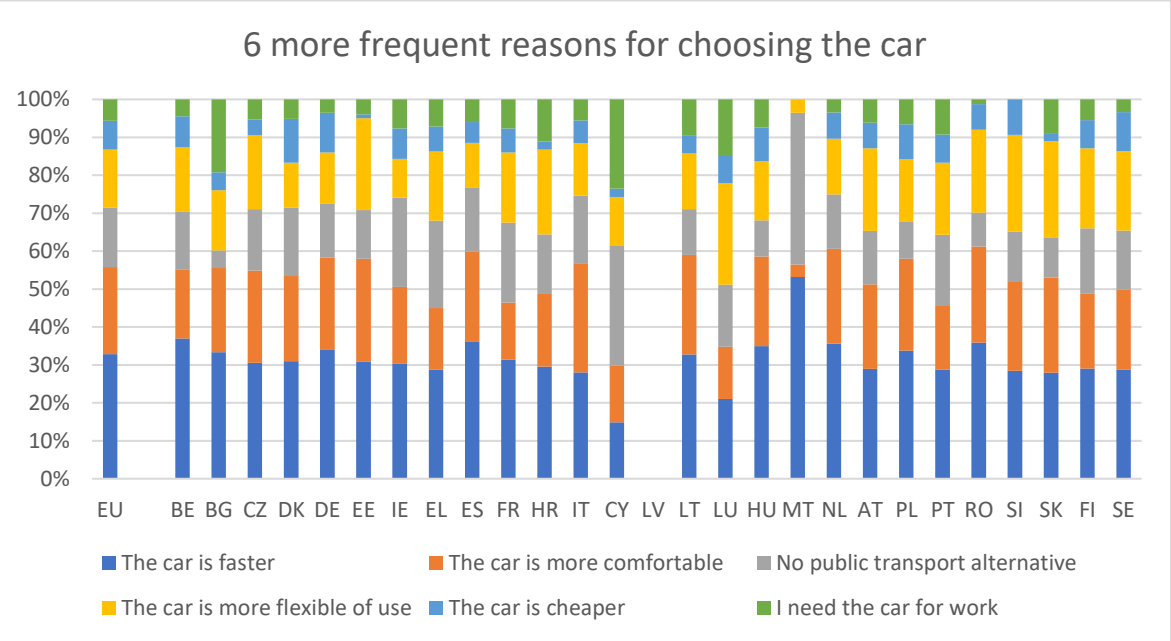


Source: DG MOVE, European Passenger Mobility Survey, 2022

4.2.2.7 REASONS FOR USING THE CAR

In the survey, some respondents used a "privately owned or on lease or company" during that day and they were asked what were their reasons for using a car, as opposed to other forms of transport. There were 13 potential reasons to choose from (with multiple answers possible). Figure 60 shows the six most frequent reasons for choosing the car for performing a trip: a car being a faster mode of transportation was the main reason in almost all Member States (except for Italy, where car being more comfortable was the main reason), Cyprus (no public transport alternative) and Luxembourg (car is more flexible).

Figure 60 – Distribution of most frequent reasons for choosing the car



Source: DG MOVE, European Passenger Mobility Survey, 2022

Both for men and for women, the main reasons for using the car are because it is faster and because it is more comfortable. However, for men both of them have a higher importance. While for men the third reason for using the car is because it is more flexible, for women the absence of the public transport alternative is more important. Other gender specific differences can be noted: for example, in comparison to men, women use the car more frequently to drop off or pick up the children at school. An analysis by age groups, reveals that although for the three age groups the main reason for using the car is because it is faster, its importance decreases with the age: 75 % in the age group 15-29, 63 % in the age group 30-64 and 52 % in the age group 65+. The comfort is the second reason for using the car for the age groups 15-29 and 30-64, while the absence for public transport alternatives is the second reason for the age group 65+ (Figure 61).30–64-yearsold people tend to use the car to pick up or drop off children at school most, among the age groups. Individuals aged 65+ years old have a higher share of people using the car for 'other' reasons (Table 10).

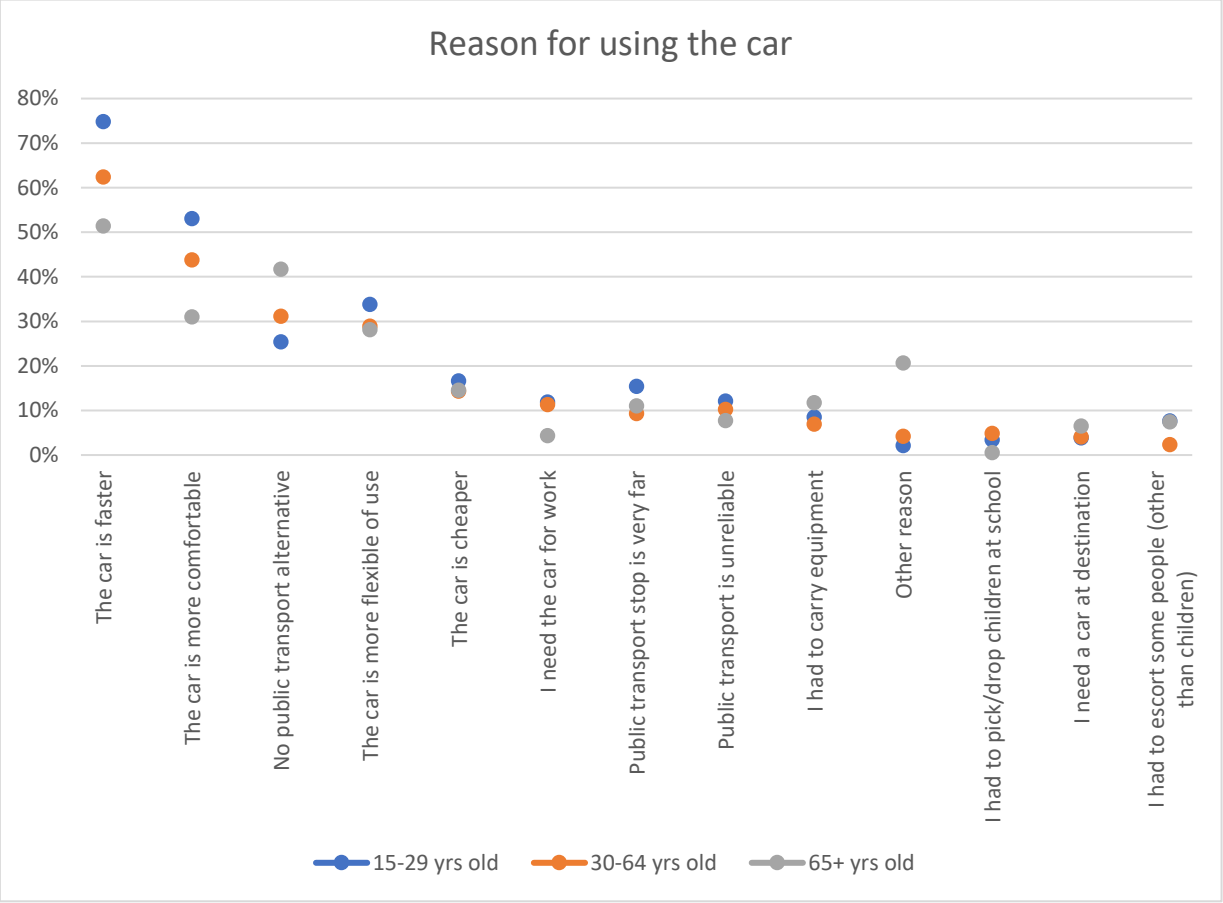
Table 10 – Distribution[37] of reasons for using the car by gender and by age group

Reason for using the car	Gender		Age group		
	Male	Female	15-29 yrs old	30-64 yrs old	65+ yrs old
The car is faster	66.5%	60.6%	74.8%	62.4%	51.4%
The car is more comfortable	46.4%	42.4%	53.0%	43.8%	31.0%
No public transport alternative	29.9%	31.7%	25.4%	31.1%	41.7%
The car is more flexible of use	31.0%	28.1%	33.8%	28.9%	28.1%
The car is cheaper	17.3%	11.1%	16.6%	14.3%	14.5%
I need the car for work	12.1%	9.5%	11.9%	11.3%	4.3%
Public transport stop is very far	12.0%	8.5%	15.4%	9.3%	11.0%
Public transport is unreliable	11.7%	8.7%	12.1%	10.2%	7.7%
I had to carry equipment	8.2%	6.4%	8.5%	6.9%	11.7%
Other reason	3.7%	6.4%	2.1%	4.2%	20.6%
I had to pick/drop children at school	3.9%	4.9%	3.4%	4.8%	0.5%
I need a car at destination	4.4%	3.7%	3.8%	4.0%	6.5%
I had to escort some people (other than children)	4.1%	2.9%	7.6%	2.3%	7.4%

Source: DG MOVE, European Passenger Mobility Survey, 2022

[37] The distribution is not equal to 100% because the respondents could choose several answers among the thirteen answers.

Figure 61 – Distribution of reasons for using the car by age group



Source: DG MOVE, European Passenger Mobility Survey, 2022

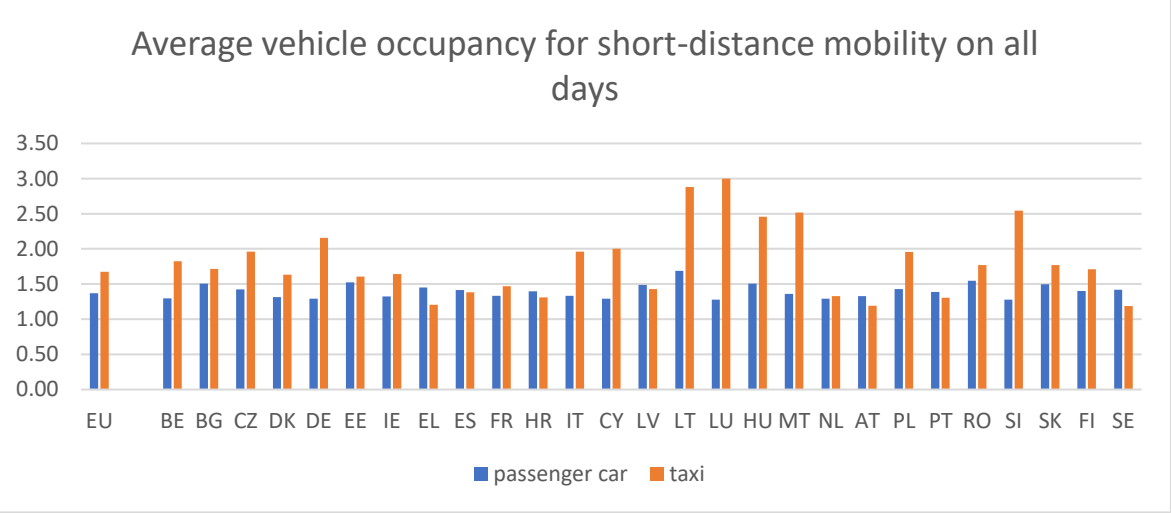
4.2.2.8 CAR OCCUPANCY

As shown above, across all Member States, 'car' is the dominant mode of transport. However, cars are a major issue in terms of GHG emissions and thus their popularity is a cause for concern. Cars can become relatively more efficient in terms of their CO_2 and other GHG emissions per passenger-km when more passengers travel in the same vehicle. Hence the interest to take a closer look at the number of passengers travelling in one car per trip.

On average, private cars (including light commercial vehicles) carry 1.4 passengers per short-distance trip in the EU-27. Values by Member State are distributed around this average and only two Member States (Latvia and Romania) show a value above 1.5 (Figure 62). In general, the occupancy is higher in Member States where the number of individuals living in households with two or more cars is lower (especially Eastern European Member States) but the differences are negligible. The occupancy ratio for passenger cars seem quite reasonable as a similar value was presented in TRACCS[38] (1.4 - 1.8 for passenger cars for most of the Member States).

Taxis (including services like Uber and Lyft) transport on average 1.7 passengers per trip (excluding the driver) in the EU-27. For this mode, differences between Member States are more significant. In some Member States, namely Greece, Portugal and Sweden, taxi is often used by one passenger only. On the other hand, in Germany, Lithuania, Luxembourg, Hungary, Malta and Slovenia, taxis are generally shared by at least two passengers or more.

Figure 62 - Average vehicle occupancy for short-distance trips on all days



Source: DG MOVE, European Passenger Mobility Survey, 2022

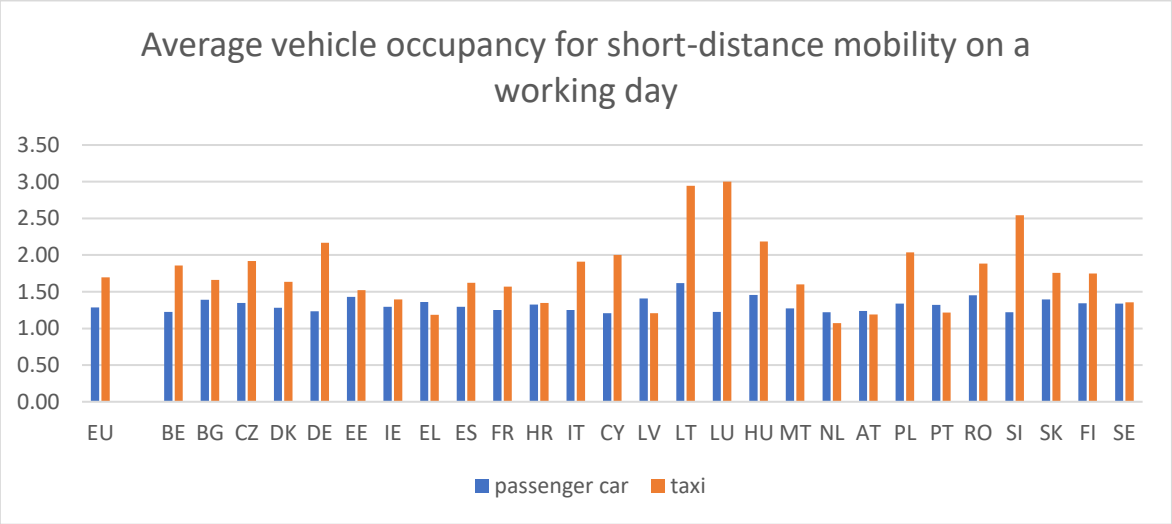
Occupancy rates are higher on non-working days (Figure 64), although remain well below 2. Given that the main difference between working days and non-working days is that there are less commuting and business trips, the data demonstrates that a significant share of commuting car trips are made by the driver alone.

The average number of passengers carried by taxis[39] is also slightly higher on non-working days than on working days, but this difference is limited.

[38] TRACCS: Transport data collection supporting the quantitative analysis of measures relating to transport and climate change" (Papadimitriou *et al.*, 2013)

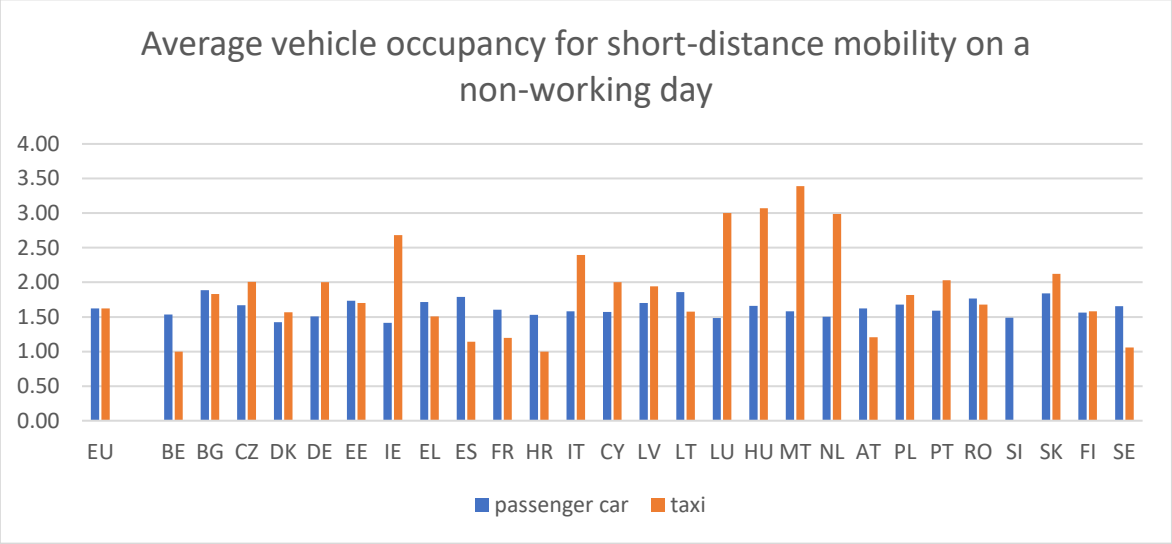
[39] This report does not reflect/examine taxi journeys performed without any passenger (e.g. approach journeys)

Figure 63 - Average vehicle occupancy for short-distance trips on a working day



Source: DG MOVE, European Passenger Mobility Survey, 2022

Figure 64 - Average vehicle occupancy for short-distance trips on a non-working day



Source: DG MOVE, European Passenger Mobility Survey, 2022

4.2.2.9 PASSENGER-KILOMETRES (PKM)

From the responses given to the survey on the number of trips and distance travelled, an estimation of passenger-kilometres (pkm) for short-distance trips can be made. As shown in Table 11, the estimation at the EU-27 level is 3 565 billion pkm. According to the most recent edition of the Pocketbook "EC Transport in Figures", total pkm for motorised land modes (i.e. excluding aviation and maritime) were some 5 400 billion in 2019. The lower value obtained from survey results is expected, as the scope of the survey excluded long-distance trips. Pkm related to active modes, present in the survey but not in the Pocketbook data, do not play a big role because even if the modal share of active transport is significant, their average distance is small. Thus, their contribution to total pkm is limited. The pkm for short-distance trips in the EU-27 is highest for car as driver with 2 179 billion while for car as passenger it is 492 billion. The destination home has the highest pkm with 1 325 billion in the EU-27 while the lowest pkm is for the education purpose with 73.5 billion. Petrol remains with the highest pkm in fuel type in the EU-27 with 713 billion (see Annex III.1 for more details).

Another result from the survey is that pkm for urban trips are 1 356 billion, i.e. some 40% of total pkm for short-distance trips. The pkm for urban trips on a working day are highest for the mode car as driver in all Member States with 586 billion for the EU-27. The travel purpose with the highest pkm is home with 619 billion. Concerning the fuel type, in the EU-27, pkm for urban trips are 307 billion for petrol followed by diesel with 226 billion (see Annex III.1 for more details).

Table 11 – Short-distance Passenger-kilometres (pkm) performed by the entire reference population, per year

MS	Short-distance Working Day (10^9 pkm)	Short-distance Non-Working Day (10^9 pkm)	Short-distance All Days (10^9 pkm)
EU	**2569.6**	**995.1**	**3564.7**
BE	58.0	21.1	79.2
BG	39.4	13.6	52.9
CZ	69.5	26.5	95.9
DK	34.5	11.5	46.0
DE	428.8	146.0	574.9
EE	9.0	4.5	13.5
IE	28.6	9.7	38.3
EL	48.9	21.5	70.4
ES	292.8	116.8	409.6
FR	380.6	139.0	519.5
HR	28.5	13.9	42.4
IT	333.8	134.8	468.5
CY	7.4	2.7	10.2
LV	12.7	5.5	18.2
LT	18.2	8.8	27.0
LU	5.5	1.6	7.1
HU	50.6	15.1	65.6
MT	2.4	1.2	3.5
NL	84.1	33.3	117.4
AT	60.5	22.5	83.1
PL	275.6	122.1	397.6
PT	62.1	24.5	86.6
RO	104.8	47.3	152.1
SI	18.7	6.3	25.0
SK	33.6	13.1	46.6
FI	35.8	14.3	50.1
SE	45.4	17.9	63.3

Source: DG MOVE, European Passenger Mobility Survey, 2022

Table 12 – Urban Passenger-kilometres (pkm) performed by the entire reference population, per year

MS	Working Day pkm (10^9 pkm)	Non-working Day pkm (10^9 pkm)	All Days pkm(pkm)
EU	**1009.6**	**345.9**	**1355.5**
BE	31.5	9.4	40.8
BG	18.0	6.9	24.9
CZ	23.0	8.2	31.2
DK	12.7	4.3	16.9
DE	216.7	63.8	280.5
EE	1.2	0.3	1.5
IE	7.3	2.6	10.0
EL	13.7	4.1	17.8
ES	120.7	47.3	168.0
FR	157.2	51.8	209.0
HR	8.9	4.3	13.2
IT	149.1	51.1	200.2
CY	2.2	0.5	2.7
LV	2.9	0.9	3.8
LT	2.7	1.5	4.2
LU	1.8	0.4	2.2
HU	20.7	6.3	27.0
MT	0.8	0.3	1.2
NL	25.0	9.1	34.0
AT	27.8	10.4	38.2
PL	98.9	37.8	136.7
PT	15.2	5.3	20.6
RO	22.3	9.9	32.3
SI	4.6	1.5	6.1
SK	4.1	1.2	5.3
FI	10.6	3.2	13.8
SE	9.8	3.6	13.4

Source: DG MOVE, European Passenger Mobility Survey, 2022

The vehicle kilometre (vkm), defined, as the movement of a vehicle over one kilometre, is a measure of transport activity. The vkm was estimated as the pkm divided by the average vehicle occupancy. In Table 13, vkm are mostly made for non-urban trips at the level of EU-27, and this is the case for almost every Member State. Only Belgium and Germany have close vkm for urban trips and non-urban trips.

Table 13 – Vkm for car trips performed by urban, non-urban and short-distance mobility on all days

MS	Urban (10^9 vkm)	Non-urban (10^9 vkm)	Short-distance (total) (10^9 vkm)
EU	**745.0**	**1206.8**	**1951.8**
BE	23.1	23.1	46.2
BG	10.0	12.1	22.0
CZ	13.1	32.5	45.6
DK	8.0	15.1	23.1
DE	159.5	160.3	319.8
EE	0.7	6.3	7.0
IE	5.8	18.0	23.8
EL	8.6	26.0	34.7
ES	84.3	132.2	216.5
FR	126.9	190.1	317.1
HR	7.6	17.2	24.8
IT	120.6	155.1	275.7
CY	2.2	5.3	7.5
LV	2.1	8.0	10.2
LT	2.1	10.3	12.4
LU	1.6	3.3	4.9
HU	11.9	14.7	26.6
MT	0.7	1.3	2.1
NL	17.2	45.2	62.5
AT	20.1	26.6	46.7
PL	74.1	137.7	211.8
PT	11.7	39.6	51.4
RO	13.6	47.5	61.1
SI	3.9	12.1	16.0
SK	2.0	20.1	22.1
FI	7.2	20.0	27.2
SE	6.2	27.2	33.4

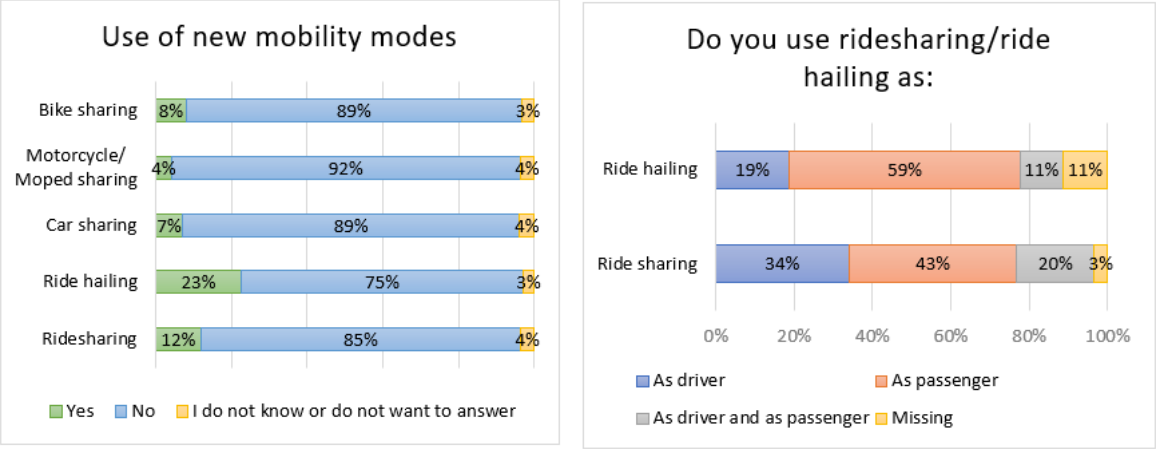
Source: DG MOVE, European Passenger Mobility Survey, 2022

4.3 Use of new mobility services

The concepts of transport 'sharing' and 'hailing'[40] has evolved over the years. These services have the potential to reduce both traffic congestion and vehicle emissions.

The survey showed that ride hailing, and ride sharing are not relatively widespread, with only 23% and 12% of the population using them, respectively. In addition, these services are not frequently used, with 70% and 60% of the population only using ride hailing and ride sharing less than once a month, respectively. Very few people use these two services on a daily basis - only 1% for ride hailing and 4% for ride sharing. Most individuals use these services as passengers (59% for ride hailing and 42% for ride sharing), as opposed to being a driver or both a passenger and a driver. The main reason to use these sharing services is to move around the city and its surroundings.

Figure 65 - New mobility services



Source: DG MOVE, European Passenger Mobility Survey, 2022

[40] Definition available in glossary.

Table 14 - Use of ridesharing by gender, age group and degree of urbanisation

Use of ride sharing/carpooling as:	Driver	Passenger	As driver and as passenger	Missing response	Total
Male	41.0%	36.9%	18.9%	3.2%	100%
Female	25.3%	50.3%	20.7%	3.7%	100%
15-29 yrs old	29.3%	49.9%	17.2%	3.6%	100%
30-64 yrs old	38.3%	37.3%	21.1%	3.2%	100%
65+ yrs old	21.2%	53.8%	20.7%	4.3%	100%
Cities (densely populated areas)	34.6%	44.6%	17.5%	3.3%	100%
Towns and suburbs (intermediate density areas)	32.5%	43.0%	21.2%	3.3%	100%
Rural areas (thinly populated areas)	34.3%	40.1%	21.8%	3.8%	100%

Source: DG MOVE, European Passenger Mobility Survey, 2022

Table 14 shows that men use ridesharing more as driver (41%) while women tend use this service as passenger (50.3%). Ridesharing as driver and as a passenger is used slightly more by women than men (a difference of 2 percentage points). People aged between 15-29 years and 65 years and more use ride sharing more as a passenger than as a driver, while the 30-64-year-old age group tend to use ridesharing more as driver than as a passenger (difference of 1 percentage point). Across all areas (cities, towns and suburbs and rural areas), ridesharing is used more as a passenger than as a driver, however this is more so the case in densely populated areas.

Table 15 - Use of ride hailing by gender, age group and degree of urbanisation

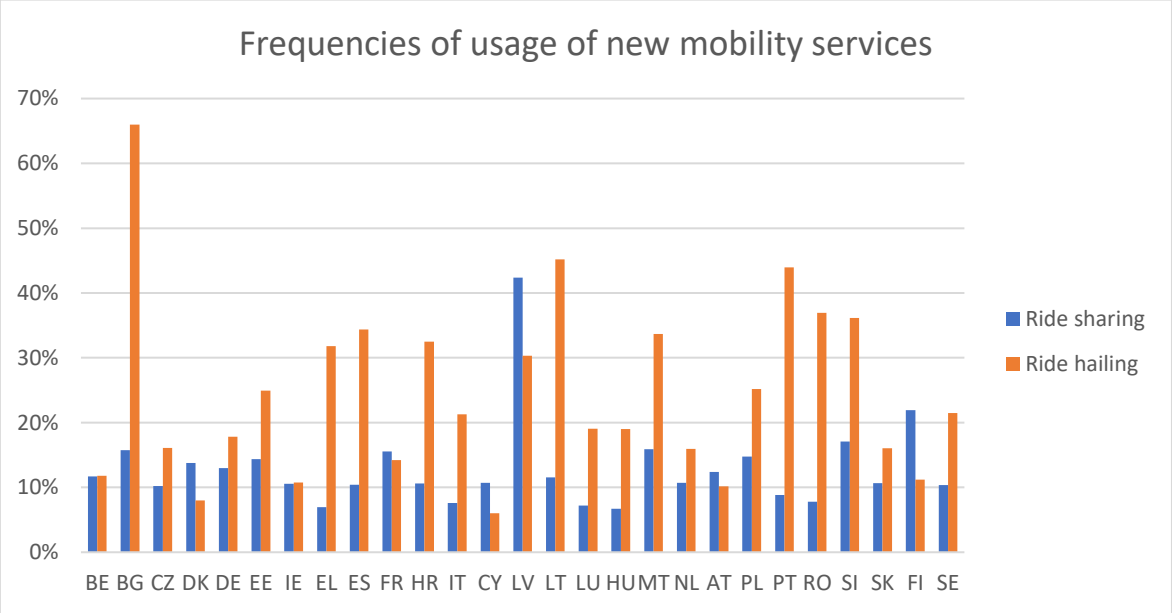
Use of ride hailing as:	Driver	Passenger	As driver and as passenger	Missing response	Total
Male	25.0%	54.0%	10.8%	10.2%	100%
Female	12.7%	63.8%	10.8%	12.7%	100%
15-29 yrs old	18.5%	58.6%	11.4%	11.5%	100%
30-64 yrs old	21.3%	56.2%	11.2%	11.3%	100%
65+ yrs old	10.3%	69.0%	8.7%	12.0%	100%
Cities (densely populated areas)	19.2%	59.3%	11.2%	10.4%	100%
Towns and suburbs (intermediate density areas)	18.0%	58.4%	10.6%	13.0%	100%
Rural areas (thinly populated areas)	18.4%	59.0%	10.0%	12.5%	100%

Source: DG MOVE, European Passenger Mobility Survey, 2022

Different trends can be observed between ages and genders when ride hailing is concerned. Both men and women use ride hailing more as a passenger, with shares of 54% and 63.8% respectively. Similarly, the share of individuals using ride hailing as passenger is above 50% in all three age groups, with the highest share (69 %) in the age group 65+ years and more age group using ride hailing as passenger. Relatively more individuals between 30-64 years use ride hailing as driver. There are similarities between ride sharing and ride hailing when looking across the different areas. In all three areas, more than 50% of individuals use ride hailing as a passenger. Lastly, people living in cities use the ride hailing service as driver slightly more than the other groups (Table 15).

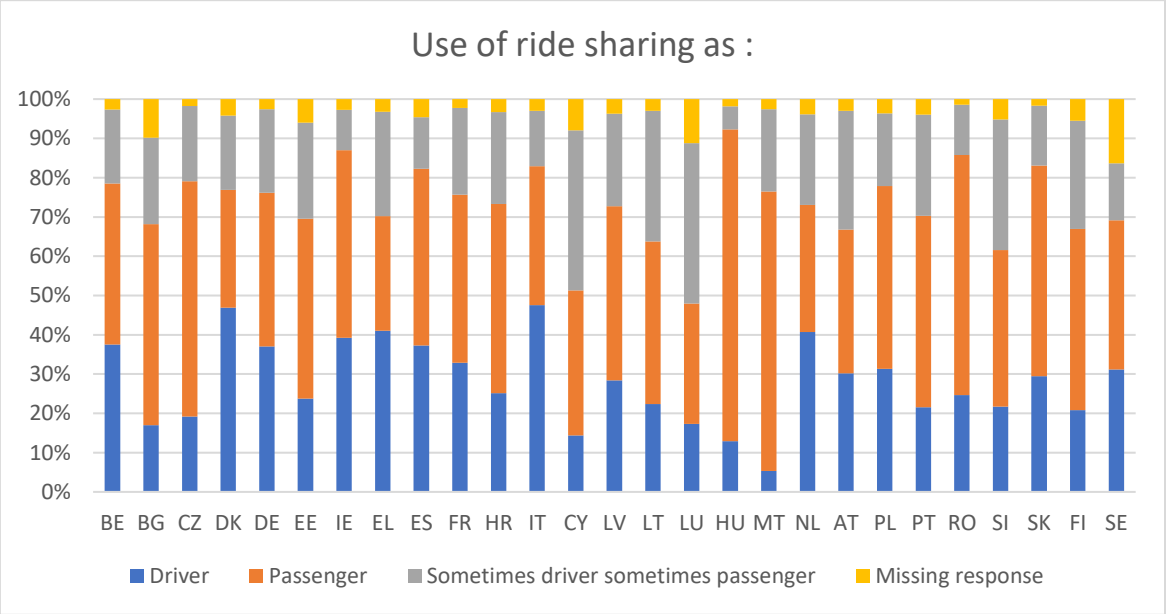
When looking at the frequency of usage of new mobility services at the level of each Member State, Figure 66 shows that the use of ride sharing is highest in, whereas Bulgaria had the highest usage of ride hailing. However, neither of these services were used frequently by the population.

Figure 66 – Use of ride sharing and ride hailing



Source: DG MOVE, European Passenger Mobility Survey, 2022

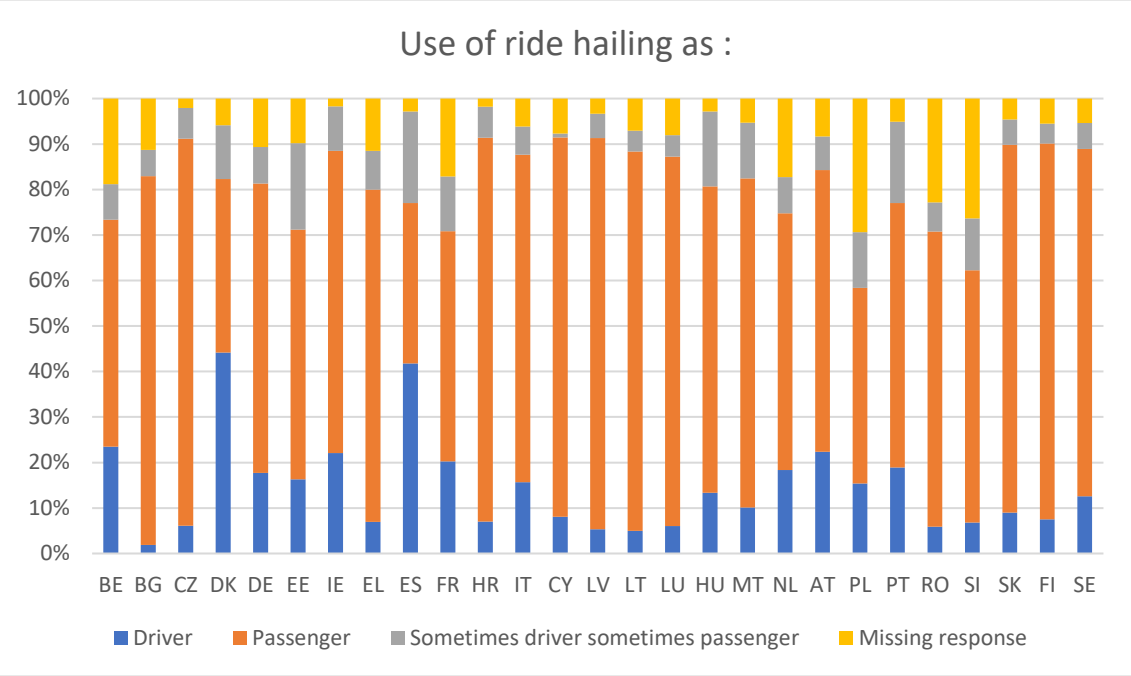
Figure 67 - Use of ride sharing as driver, passenger or both



Source: DG MOVE, European Passenger Mobility Survey, 2022

When considering ride sharing, almost all Member States have a higher share of individuals using these services as passenger, except in Denmark, Greece, Italy and the Netherlands. In Cyprus, on the other hand, there were relatively more individuals using ride sharing as driver or passenger (Figure 67). When considering ride hailing, all Member States use these services mostly as a passenger, with the highest share in Bulgaria. The share of individuals using ride hailing either as driver or as a passenger is relatively higher (and similar) in Spain and Estonia (Figure 68).

Figure 68 - Use of ride hailing as driver, passenger or both



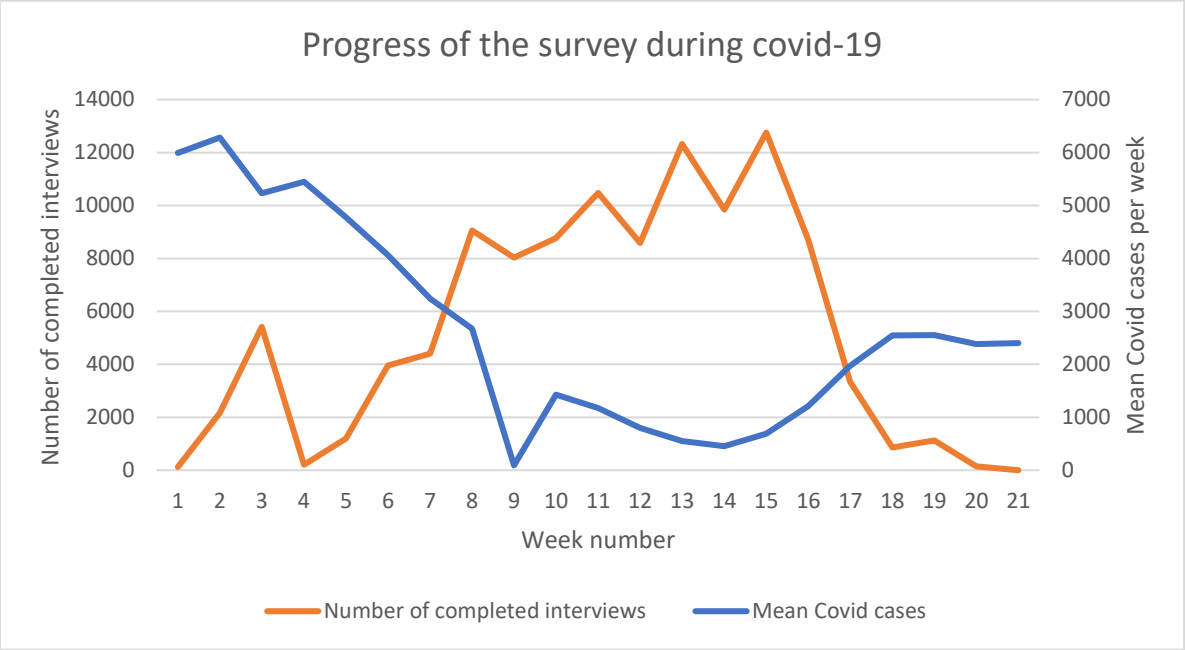
Source: DG MOVE, European Passenger Mobility Survey, 2022

5 COVID-19 Impact

The survey also examined the impacts of the Covid-19 pandemic on mobility in the Member States. The advent of the pandemic and significant rise in cases caused lockdowns and curfews to be imposed across the world, which resulted in unprecedented restrictions on mobility.

Figure 69 shows the number of new cases in the EU-27 across the duration of the survey rollout. During the data collection period from 19th March 2021 to 8th August 2021, the average number of new cases in Europe decreased from week 1 to week 14, then increases until week 18 and reaches a stable level for the last 3 weeks of the survey.

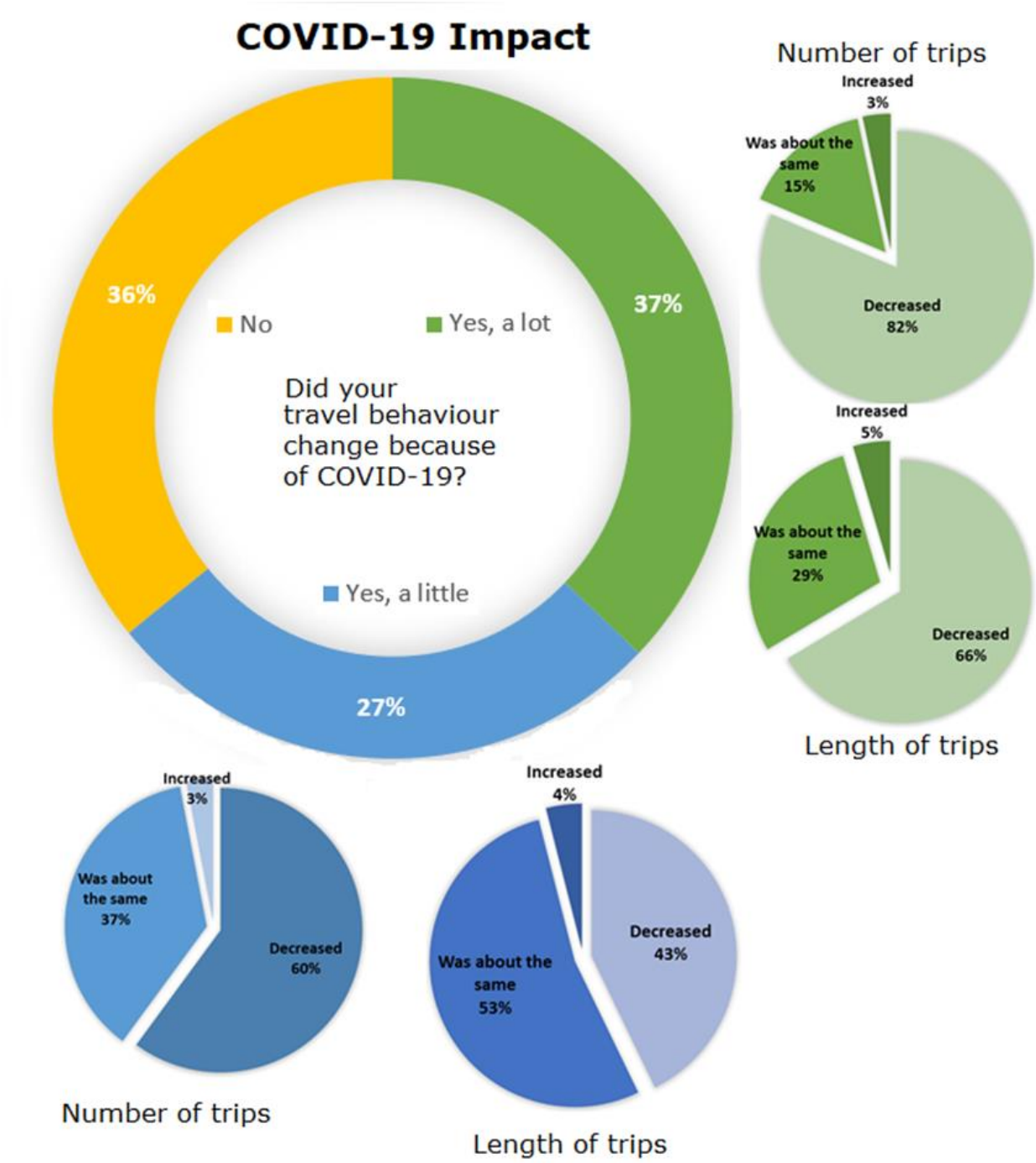
Figure 69 - Average number of new cases (in million) in Europe per survey week



Sources: https://www.ecdc.europa.eu/en/covid-19/data and
DG MOVE, European Passenger Mobility Survey, 2022

Figure 70 shows the impact of COVID-19 on travel behaviour, with 64% of respondents noting that their travel behaviour was affected and 37% of the respondents observing a 'great change'. The most visible effect for the respondents observing a 'great change' is a very sharp decrease in the number of trips, with 82% of respondents travelling less, and only 3% experiencing an increase in trips. Similarly, decreases of around 66% in the distance travelled and trip length can also be noted, while increases were experienced among only 5% of respondents. For those individuals whose behaviour only changed slightly, 60% saw a decrease in trip frequency and again only 3% experienced increases. Trip length, on the other hand, decreased among 43% of respondents yet remained the same for 53% of respondents.

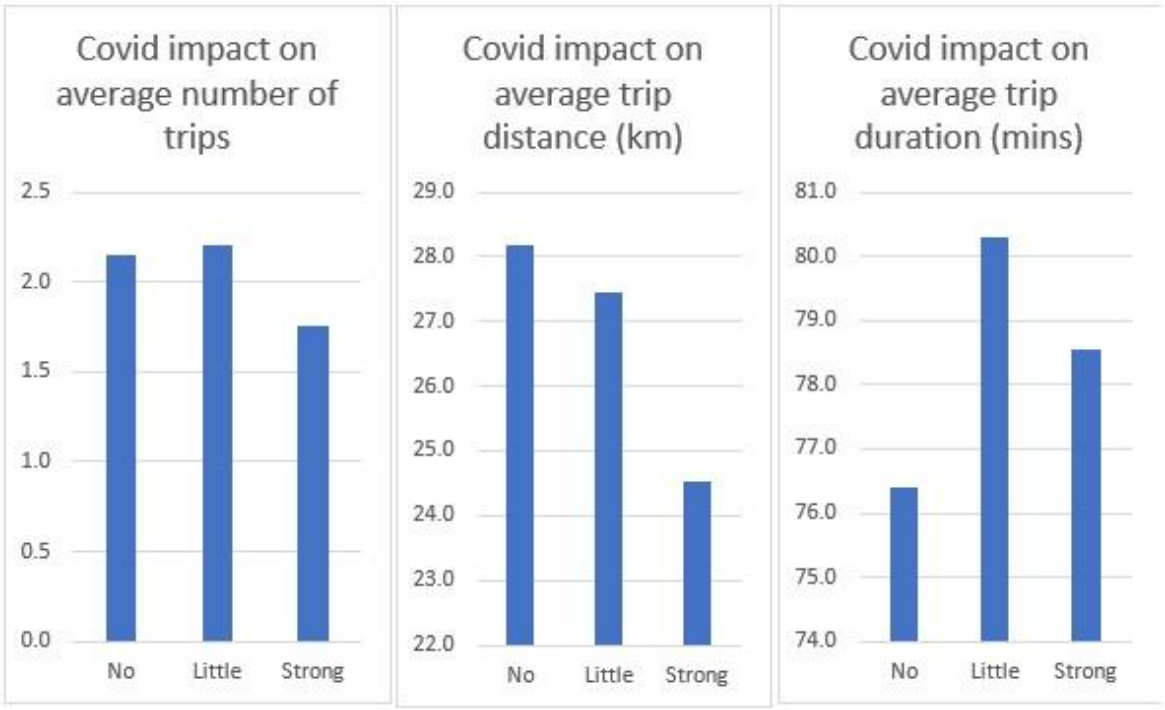
Figure 70 - COVID-19 impact on mobility



Source: DG MOVE, European Passenger Mobility Survey, 2022

Figure 71 illustrates the impact of the pandemic on the travel habits of respondents within the EU-27. The difference in the number of trips is not significant between those that were somewhat affected and those that were not affected at all, while those whose travel behaviour changed significantly have a slightly lower number of trips. A similar pattern can be seen when looking at the impacts of COVID-19 on the distance travelled. However, when looking at time travelled we see that those not affected by COVID-19 experienced the largest drop in time travelled, around four and two minutes less than those who experienced slight and strong impacts from COVID-19, respectively.

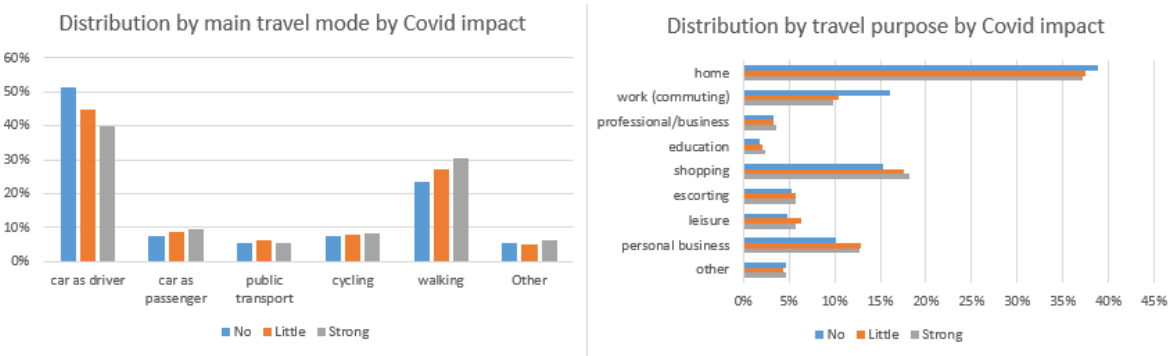
Figure 71 - Covid impact on number of trips, travelled distance and travelled duration



Source: DG MOVE, European Passenger Mobility Survey, 2022

Figure 72 shows the impact of COVID-19 on travel modes and purposes. Those most affected by COVID-19 travelled less by car as drivers in terms of number of trips, but they made more trips by walking. For those using cars as passengers, public transport, cycling or other modes, the breakdown is relatively the same for all of them regardless of the COVID-19 impact. Those who were not impacted by COVID-19 travelled for work more often than those who were heavily impacted. However, individuals who were impacted travelled far more to shop and do personal business than those that were not impacted at all.

Figure 72 - Distribution of number of trips by main travel mode and travel purpose by covid impact



Source: DG MOVE, European Passenger Mobility Survey, 2022

6 Conclusions

The aim of the New Mobility Patterns survey was to collect comparable data on passenger mobility across the EU Member States. In every Member State, it has been possible to reach a balanced and representative sample with a coverage of the urban, non-urban, and rural areas of the Member State. This fieldwork was conducted between March and August 2021. In total, more than 110 000 persons aged between 15 and 84 years old responded, with at least 1 000 surveys completed in each Member State.

This study provides a comprehensive assessment of several indicators on the mobility in the EU Member States. Some relevant results can be summarised as follows:

- 53% of respondents have one car in their household and almost 34% live in a household with more than two cars. The share of households with three or more cars available is 6%, but some Member States show much higher values. In rural areas, the share of people living in households with three cars or more is higher.
- Men perform 2.1 trips per day, while women perform 1.9 trips per day.
- Couples with children travel more than any other type of household: 2.4 trips per day, compared to 2 trips per day performed by single parent family or 1.7 trips per day performed by couples without children or single persons.
- Mobility rates are similar for the age groups up to 55 years, after which mobility progressively declines, except when walking is concerned.
- Work accounts for nearly one quarter of short-distance[41] trips made by employed individuals, while education explains nearly 15% of all trips made by students. Shopping is the most frequent travel for people not in employment or education.
- Shopping and personal business[42] account for almost 30 % of the trips, with leisure trips becoming more important on non-working days.
- 2.6% of short-distance trips per day made by women are performed for care/health related purposes while men make only 1.9% trips for these purposes.
- The number of trips is positively correlated with car availability.
- Urban trips account for about a half of short-distance trips. The structure of short-distance trips by purpose on a typical day is very similar across the EU, with commuting, shopping, and other personal business accounting for the largest share of trips (excluding the purpose "home").
- 54% of short-distance trips are made by private car in most Member States, while walking accounts for about 27%.
- Walking is the most popular mode of transport for non-car trips in most of the EU, with the most noticeable exception being the Netherlands, where biking is prevalent.
- The modal split of short-distance trips made on working days is not significantly different from that of an average day and this holds for all EU.
- 27 km per day is the average distance travelled for short-distance trips by EU citizens, with 20 km being the minimum daily average travelled distance. At EU level, the average distance travelled daily is basically the same on working and non-working days, but this does not always hold at Member State level. This result is not directly correlated to the average number of short-distance daily trips.
- 1h20 minutes is the average duration of short-distance trips per day. This result is correlated with both the average length of trips and the share of urban trips.

[41] All trips that are under 300 km.

[42] Personal Business includes care/health, general errands (post office / formalities / seeking for employment / etc.), restaurant / meal (go out for a meal / snack / carry-out) and visiting friends or relative.

- 33 km/h is the average travel speed[43] for passenger cars. For other modes of transport (excluding train), lower values were found, showing that individuals travel at speeds which are well below the technical potential of motorised transport modes.
- 45% of respondents in the EU-27 use petrol fuelled cars for short distance trips[44]. Diesel is the second most used fuel type at 40%. Petrol/diesel hybrid and electric vehicles are used each by only 3% of the respondents.
- The main reasons for choosing to travel by car are: because it is faster, more flexible to use, more comfortable, cheaper, there is no public transport alternative and because it is needed for work.
- 1.4 passengers is the average occupancy rate for private cars, with limited variability across Member States. Occupancy is higher during non-working days, but always well below two persons per car.
- 70% of the surveyed population use ride hailing and 60% use ride sharing less than once a month. Ride hailing (23%) and ridesharing (12%) are the most commonly used new mobility services. Very few people use these two services on a daily basis. The main reason to use ridesharing is to move around the city and its surroundings.

The pandemic caused by the spread of the COVID-19 virus caused major disruptions to transport systems and economies all around the world. Given the significance of these impacts, the NMP survey was reviewed and adjusted[45] to include questions to understand these impacts. This report thus also captures the effects of the pandemic on travel behaviour within the EU, with some of the main findings being as follows:

- 64% of respondents said that their travel behaviour was affected by the pandemic; 37% of the respondents reported having experienced significant changes.
- The most visible effect is a very sharp decline in the number of trips, experienced by 82% of the respondents who reported having experienced significant changes. 53% of respondents who were somewhat impacted by COVID-19 stated that their trip length did not change, while 66% of respondents whose behaviour changed significantly as a result of the pandemic declared a decrease in trip length.

To conclude, this survey represents an invaluable instrument to compare mobility patterns across Member States as well as to establish a reference best practice for future studies and surveys.

[43]Average maximum travel speed is calculated as the sum of maximum travel speeds of all member states divided by the number of member states.

[44] Fuel type "Other/unknown" is not included.

[45] Which was originally planned to start on March 2020.

Glossary

In line with the Eurostat guidelines on Passenger Mobility Statistics, the following definitions have been used:

Target: is the target number of successfully completed surveys.

Completed survey/interview: is the total number of successfully completed surveys (excluding screen outs and dropouts).

Progress: is equal to Completed surveys/Target.

Screen outs and quota full: are respondents that screened out from the survey because they do not fit the target group or because the quota (per age or gender, for example) is already full.

Dropouts: are respondents that started the survey but did not complete it (excluding screen outs).

The *dropout rate:* is equal to Drop outs/ (Completed surveys + Drop outs)

The *response rate:* is equal to Completed surveys/ (Completed surveys + Drop outs).

Degree of urbanisation (DEGURBA): classification of local administrative units (LAUs) as cities, towns and suburbs or rural areas based on a combination of geographical contiguity and population density. It classifies three types of area:

- Cities (densely populated areas)
- Towns and suburbs (intermediate density areas)
- Rural areas (thinly populated areas)

Trip: is the movement from an origin (stay) to the next stay, the destination. The origin and destination may have the same location or purpose, where the trip is the movement in-between. A trip could be made in one or a series of stages.

Stage: is a continuous movement with one single mode and one single vehicle, including any waiting time before the start. For example, the trip from home to work can be made by a car from home, going to the train station, then using the train to reach the workplace. This trip is the combination of two stages, the first being the car travel and the second being the train travel. Changing mode or even changing vehicle means a new stage.

Distance: is defined as the length of the travelled route (normally along roads).

Urban mobility: all trips that are under 100 km and are made within a Functional Urban Area (FUA).

A Functional Urban Area (FUA): consists of a city and its commuting zone, where the latter represents the area of influence of the city in terms of labour market flows. For details see: Functional urban areas by country

Short-distance mobility: All trips that are under 300 km. Therefore, short-distance mobility includes urban mobility.

All days: are defined as any day in the year.

Working days: are defined as the five weekdays, from Monday to Friday, excluding official holidays.

Non-working days: are defined as Saturday, Sunday and bank holidays.

Travel time: for a trip is the duration from the moment of departure from one activity to the moment of arrival at the next activity.

Mode: is defined as a vehicle or non-vehicle (such as walking) used for travelling.

Main travel mode: is defined as the mode that accounted for the highest travel distance for the whole trip. This report included the main travel modes and the main travel modes in details. For example: The details of car (total) are car as a driver and car as a passenger. Train (Total) includes high-speed train, urban rail and regular/regional train.

Travel purpose: is the main activity at the destination of a trip.

Car occupancy: is defined as the number of persons in a passenger car.

Ride sharing/Carpooling: An arrangement through websites or mobile apps, in which a passenger travels in a private vehicle driven by its owner, heading in the same direction for a fee or for free. E.g. Blablacar, Klaxit, Carpooling, iDVROOM, Europe-carpooling, Mobicoop, Kowo, etc.

Car sharing: A form of car-rental service, which offers to its members the possibility to book a car by the hour or day. The online booking (through websites or mobile apps) is available 24 hours a day, 7 days per week. Reservation, pickup and return are done on a self-service basis. Usually the vehicle locations are geographically distributed and unattended. E.g. Zipcar, Car2Go / Share Now, Cambio, Getaround, CarAmigo, Emov, Pony, etc.

Ride hailing: A service which, similar to taxi service, allows the passenger to ask for a car and driver to come immediately and take you somewhere. E.g. Taxi, Uber, Lyft, etc.

Motorcycle / moped sharing: A form of motorcycle / moped rental service, which offers to its members the possibility to book a motorcycle or moped by the hour or day. The online booking (through websites or mobile apps) is available 24 hours a day, 7 days per week. Reservation, pickup and return are done on a self-service basis. Usually the vehicle locations are geographically distributed and unattended. E.g. Yego, Vulog, Helbiz, MiMoto, etc.

Bike sharing/Bike rental: The possibility to borrow a bike either by paying only the usage time or by paying a fee for the rental period. E.g.: Nextbike,

The main definitions for the calculation of the indicators reported in the next sections are the following:

- The distribution of the *main travel mode* is calculated as the total number of trips per mode divided by the total number of trips.
- The distribution of the *trips' purpose* is calculated as the total number of trips by purpose divided by the total number of trips.
- The distribution of *distance by main travel mode* is calculated as the total distance travelled per mode divided by the total distance.
- The distribution of *distance by trip purpose* is calculated as the total distance travelled per trips' purpose divided by the total distance.
- The distribution of *distance travelled by fuel type* is calculated as the total distance travelled by passenger car per type of fuel divided by the total distance travelled by passenger car (car as drivers and car as passengers).
- The *average number of trips* is calculated as the sum of the weighted number of trips divided by the weighted number of respondents.
- *Mobility rate* is calculated as the weighted number of the respondents who made at least one short-distance trip divided by the weighted number of all respondents.
- *Average maximum travel speed* is calculated as the sum of maximum travel speeds of all member states divided by the number of member states.

References

A survey in 20 European cities on behalf of the JRC of the European Commission to explore the impacts of COVID-19 outbreak on urban transport. s.d. http://www.trt.it/en/PROGETTI/survey-urban-transport-the-aftermath-of-the-covid-19-outbreak/.

Andridge, Rebecca R., et Roderick J. A. Little. «A Review of Hot Deck Imputation for Survey Non-response.» *Int Stat Rev.*, 2010: 40-64.

Data on Coronavirus Pandemic (COVID-19). s.d. https://www.ecdc.europa.eu/en/covid-19/data

Deville, Jean-Claude, et Carl-Erik Särndal. «Calibration Estimators in Survey Sampling.» *Journal of the American Statistical Association, 87, 376*, 1992.

EMTA Barometer of public transport in the European metropolitan areas. s.d. https://www.emta.com/spip.php?article267&lang=fr.

Enquête Nationale sur l'Autopartage - Edition 2019. s.d. https://librairie.ademe.fr/consommer-autrement/458-enquete-nationale-sur-l-autopartage-edition-2019.html.

EU Survey on issues related to transport and mobility. 2015. https://publications.jrc.ec.europa.eu/repository/handle/JRC96151.

European Green Deal. s.d. https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en.

Eurostat (2008):
Eurostat sampling reference guidelines - Introduction to sample design and estimation techniques https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/ks-ra-08-003

Eurostat Guidelines on Passenger Mobility. s.d. https://ec.europa.eu/eurostat/documents/29567/3217334/Guidelines_on_Passenger_Mobility_Statistics+%282018_edition%29.pdf/f15955e3-d7b4-353b-7530-34c6c94d2ec1?t=1611654879518.

Free-Floating bikesharing in Paris: users' behaviors and mobility impacts. s.d. https://6-t.co/en/freefloating-bikesharing-paris/.

International Transport Forum. s.d. https://www.2021.itf-oecd.org/.

Mobility as a Service. s.d. https://www.maas4eu.eu/.

Mobility Strategy. s.d. https://transport.ec.europa.eu/transport-themes/mobility-strategy_en.

OPTIMISM. 2013. https://cordis.europa.eu/project/id/284892/reporting.

Quarter million parisians using dockless electric sccoters study finds. s.d. https://v1.li.me/second-street/quarter-million-parisians-using-dockless-electric-scooters-study-finds.

Results of Impact Analysis of Car-Sharing Services and User Behaviour Delivers Interesting Results in Bremen. s.d. https://share-north.eu/2018/05/results-of-impact-analysis-of-car-sharing-services-and-user-behaviour-delivers-interesting-results-in-bremen/.

SHANTI. s.d. http://shanti.inrets.fr/.

Special Eurobarometer 406: Attitudes of Europeans towards urban mobility. s.d. https://data.europa.eu/data/datasets/s1110_79_4_406?locale=en.

Special Eurobarometer 420: Passenger Rights. s.d. https://data.europa.eu/data/datasets/s2011_82_1_420?locale=en.

State-of-the-art survey on stakeholders' expectations for Mobility-as-a-Service (MaaS) – highlights from Europe. 2016. https://research.chalmers.se/en/publication/234926.

STUDY – Carpooling saves more than 1.6 million tonnes of CO2 a year, whilst doubling the number of people traveling. s.d. https://blog.blablacar.com/newsroom/news-list/zeroemptyseats.

Terrell, George R., et David W Scott. «Variable Kernel Density Estimation.» *Ann. Statist*, 1992: 1236-1265.

The Impacts of Uber on Car Use in the Greater Paris Region. 2019. https://6-t.co/en/impact-uber-idf/.

Uses and users of free-floating e-scooters in France. s.d. https://6-t.co/en/etudes/uses-and-users-of-free-floating-e-scooters-in-france/.

What is the European Green Deal? 2019. https://ec.europa.eu/commission/presscorner/detail/en/fs_19_6714.

Why 6t. s.d. https://6-t.co/en/why-6t/.

Annex I: Systematic review of existing travel surveys

This chapter presents the most up-to-date results from a systematic review of the mobility surveys in Europe and a solid literature background at different geographical levels. By reviewing the National Travel Surveys (NTS) and additional studies related to mobility patterns, the scope is to provide the latest information about mobility behaviours and trends in the EU. Even though differences in the methodologies and in the concepts used to measure mobility and travel behaviour hinder comparisons across surveys and hamper the emergence of meaningful cross-national considerations, the results of this review still provide a preliminary quantitative reference to be used as background information for our survey (see section I.2).

I.1 Results of previous European projects

Over the course of the years, several European projects have focused on the topic of travel surveys and have attempted to provide a response to the methodological and structural differences amongst travel surveys from different Member States.

The need for harmonisation among NTS was firstly addressed by the 2013 EU research project **OPTIMISM**[46], the objective of which was to compare trip information between 10 countries and identify gaps in the harmonisation of travel behaviour data. This was carried out by establishing which Member States are collecting NTS, identifying which information and travel data is collected, examining how the surveys are designed in terms of data classification, sampling, and survey implementation, and assessing whether travel data from different Member States can be compared.

Results of the NTS assessed by OPTIMISM (covering years between 2003 and 2011) showed that the average number of daily trips per person ranged between 2.7 and 3.6 trips. Moreover, the average trip length (ranging between 11.5 and 15.8 km) and the average trip duration (ranging between 21.8 and 24.2 minutes) were quite similar across the countries. In terms of modal split, car usage is dominant, between 60% to 80% in the countries surveyed, with Cyprus being the only exception (over 95%).

Similarly, the EU-funded project **Survey Harmonisation with New Technologies Improvement**[47] (acronym "SHANTI"), active between 2009 and 2013, aimed at harmonising methods for the production and processing of national mobility data, taking into account the contributions of certain new technologies (gps traces, gsm, rds, etc.), to be able to carry out transnational comparisons of surveys. After a long and demanding post-processing of data from different NTS, SHANTI showed that it was possible to post-harmonise NTS, with results that are significant, even if the collection methods vary considerably.

Results from the post-harmonisation of surveys held between 2006 and 2010 showed that in European countries, the median share of non-mobile persons was 18% (ranging from between 8% in Germany and 28% in Belgium). Also, in the EU countries surveyed, the average km per traveller was 44.2 (km/day), the time of travel was 80.5 (minutes per day), and the average number of trips per person per day was 3.54, in line with the results of OPTIMISM.

JRC conducted two **EU-wide studies**[48] to collect comparable indicators on passenger mobility across the EU Member States as well as on citizens' knowledge of and

[46] https://cordis.europa.eu/project/id/284892/reporting

[47] http://shanti.inrets.fr/

[48] https://publications.jrc.ec.europa.eu/repository/handle/JRC96151

preferences regarding emerging transport technologies (e.g. the use of ICT applications), organisational models and policy measures. The main results of the 2018 survey enabled data and information to be collected (in a homogeneous way) from all EU-28 Member States and was able to provide some useful comparisons with the previous edition.

Considering the most frequent trip, the JRC study highlighted that car was again the dominant transport mode (over 50% at the EU level). Also, the average duration (of the most frequent trip) was nearly 45 minutes and the average length was around 17 km. Duration was significantly higher (more than 60 minutes) when trips were made by car. Regarding new mobility trends, the survey showed that between 2013 and 2018, the propensity to use electric cars increased and the share of people holding a car sharing subscription doubled.

In addition, it is relevant to mention that in 2020, the JRC launched a survey[49] to understand **individuals' urban mobility patterns in light of the behavioural changes caused by the COVID-19 pandemic**. The results of the study suggested three main challenges in the mobility landscape. Firstly, the pandemic appears to have led to a significant increase in car use and car ownership. Secondly, public transport faced a major decline in passenger volumes, with a higher risk of financial distress for operators that could lead to lower levels of service. Lastly, a high uncertainty regarding the future of emerging technologies and business models, in particular shared mobility, emerged. That said, it is very likely that these trends are partially temporary (for the short-term, post-pandemic) and will eventually be contradicted as the pandemic pressure unwinds.

Also, it is worth citing two **Eurobarometer reports,** realised at EU level by means of a series of standard surveys (a one-off exercise) that were carried out in all EU Member States. In *Attitudes of European towards urban mobility*[50] (2013), where 27 000 Europeans were interviewed, the results showed that half of respondents used a car everyday (50%), which was significantly higher than the proportion who cycle (12%) or use public transport (16%) combined. However, there were notable differences among EU Member States. Over 80% of respondents used a car daily in Cyprus, compared with only 24% in Hungary. In *Passenger rights*[51] (2014), the survey pointed out that 78% of respondents used public transport services (including air, train, ship and ferry and long-distance coach). The most commonly used transport service was local urban transport (including trams, buses, metro, commuter trains, etc.) (59%), followed by national rail. The highest usage of public transport services was recorded in Sweden (95%) and the lowest in Cyprus (57%).

Beside these European studies, several mobility surveys have been carried out at local **level**. It is common that cities conduct a local mobility survey before implementing new plans (e.g. Sustainable Urban Mobility Plans) or for other particular purposes. These surveys are usually tailor-made for each specific case/city and do not follow any particular guidelines or a standardised methodology, thus making it almost impossible to compare them or to obtain homogeneous information across them. One example of a relevant project that used local travel surveys is the *EMTA Barometer*[52], which annually analyses the most important indicators in terms of changes in mobility trends in metropolitan areas. Results from the 2021 edition (based on 2019 data) showed that

[49] http://www.trt.it/en/PROGETTI/survey-urban-transport-the-aftermath-of-the-covid-19-outbreak/

[50] https://data.europa.eu/data/datasets/s1110_79_4_406?locale=en

[51] https://data.europa.eu/data/datasets/s2011_82_1_420?locale=it

[52] https://www.emta.com/spip.php?article267&lang=fr

public transport modal share ranged between 5% and 40%, active modes between 19% and 47% and motorised modes between 35% and 70%. Also, car ownership rates ranged from between 3500 and 700 cars per 1 000 inhabitants.

The other example is the PASTA project[53], which undertook a survey, administered between 2014 and 2017, that investigated travel behaviour and physical activity in seven EU cities by interviewing 10,000 volunteers who described more than 46,000 trips. Among the takeaways, 50% of responders rode a bike at least once per week. On average, bike trips took 27 minutes and were 5km long. Also, the survey pointed out that over 40% of car and public transport trips are less than 5km.

I.2 Results from National Travel Surveys (NTS)

NTS are surveys conducted to monitor travel behaviour by collecting information about the individual or the household (socio-economic, demographic, etc.) and a diary of their journeys on a given day (mode of travel, purpose, duration, etc.). Through desktop research the latest NTS carried out in each of the EU-27 Member States were identified. Overall, for 24 out of 27 EU-Member States, it has been possible to gather more or less detailed information about the latest version of the NTS implemented in that particular Member State. The latest available NTS range from 2006 to 2019 (Table 16). In most cases, it was possible to retrieve final publication reporting details about the methodology adopted and the main results achieved.

[53] https://pastaproject.eu/home/

Table 16 - Name of last identified survey for the EU-27 Member States, and its year of implementation (source: own elaboration)

EU-27 Member States	Name of last identified survey (local language)	Year
Austria	Österreich unterwegs	2013-2014
Belgium	Enquête sur la mobilité des Belges (MONITOR)	2017
Bulgaria	Извършване на национално проучване за определяне цената на времето	2015
Croatia	Survey on transport habits of the population of the Republic of Croatia	2016
Cyprus	Έρευνα Διακίνησης Επιβατών/Ατόμων σε αποστάσεις κάτω των 100 χιλιομέτρων	2008
Czechia	Česko v pohybu	2018
Denmark	Transportvaneundersøgelsen (TU)	2018
Estonia	No survey identified	n/a
Finland	Valtakunnallinen henkilöliikennetutkimus	2016-2017
France	Enquête Mobilité des personnes	2018-2019
Germany	Deutsches Mobilitätspanel (MOP) Mobilität in Deutschland (MiD)	2018-2019 2017
Greece	Documentation not available	2018
Hungary	A lakossági közösségi és egyéni közlekedési jellemzői	2012
Ireland	National travel survey (NTS)	2017
Italy	Rapporto sulla mobilità degli italiani (AUDIMOB)	2019
Latvia	Latvijas iedzīvotāju mobilitāte	2017
Lithuania	No survey identified	n/a
Luxembourg	Enquête Luxmobil	2017
Malta	National Household Travel Survey (NHTS)	2010
Netherlands	Onderweg in Nederland (ODiN) Onderzoek Verplaatsingen in Nederland (OViN)	2018 2015
Poland	Documentation not available	2015
Portugal	Inquerito a Mobilidade nas Areas Metropolitanas do Porto e de Lisboa	2015-2018
Romania	Documentation not available	2017
Slovakia	No survey identified	n/a
Slovenia	Smart Telephones as a Method of Data Collection in the Passenger mobility Statistics	2016
Spain	Encuesta de Movilidad de las Personas Residentes en España (MOVILIA)	2006-2007
Sweden	Den nationella resvaneundersökningen (RVU)	2015-2016

A detailed analysis of the NTS identified four general indicators of travel behaviour in the Member States: modal split, average trip distance and duration, daily travel distance and time and average number of daily trips. These indicators, which were only available for a limited number of Member States, allow for some comparisons between countries in terms of travel patterns. However, for the most part comparisons were limited due to the variety of methods that are used to collect data, differences in the type and format of data collected, differences in the years in which the NTS were conducted and, most importantly, differences in data availability itself. In many cases, comparability was limited (or even impossible) due to the application of distinct methodological approaches based on varying concepts (e.g. the definition of what is regarded as a trip), differing data collection times (e.g. workday coverage vs. seven-day week), specific

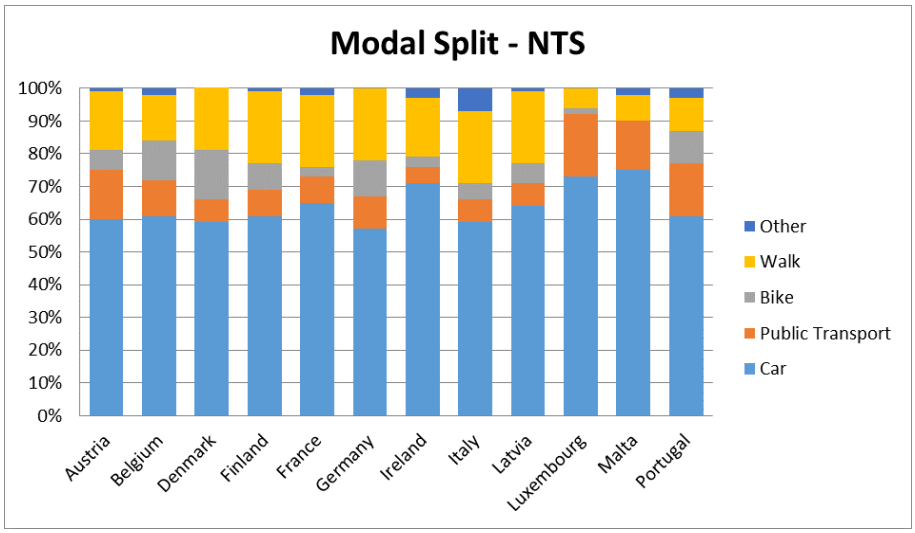
national conditions (e.g. availability of sampling frames etc.) or the prevailing law (e. g. data protection regulations, privacy policy).

MODAL SPLIT

The first indicator considered in this meta-analysis is the modal split, i.e., the type of transport mode used most frequently over the volume of all trips. Even though almost every NTS collects information on the percentage of travellers using a particular type of transportation, some methodological differences exist among Member States. In some cases, the modal split is based on the total distance travelled while others focus on the mode used for the most common trip. In some cases, only commuting trips are considered while in others all national trips account for the NTS modal split information.

A modal split overview for the countries where it was possible to extract such an indicator is shown in Figure 73. Overall, car is unequivocally the predominant mode of transport, with an average share of 64% across the 12 Member States, with a peak of 75% in Malta and a low of 57% in Germany. Public transport accounts for 10% of daily trips, while walking and biking for 18% and 6% respectively. Denmark, Belgium, and Germany are the only three Member States where bike modal split is over 11%.

Figure 73 - Modal split according to the latest available NTS

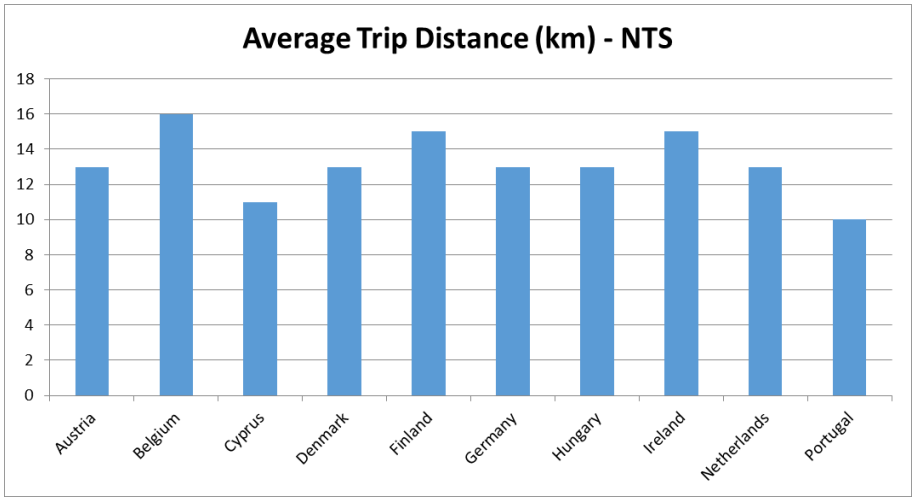


Source: own elaboration based on NTS data

AVERAGE TRIP DISTANCE AND DURATION

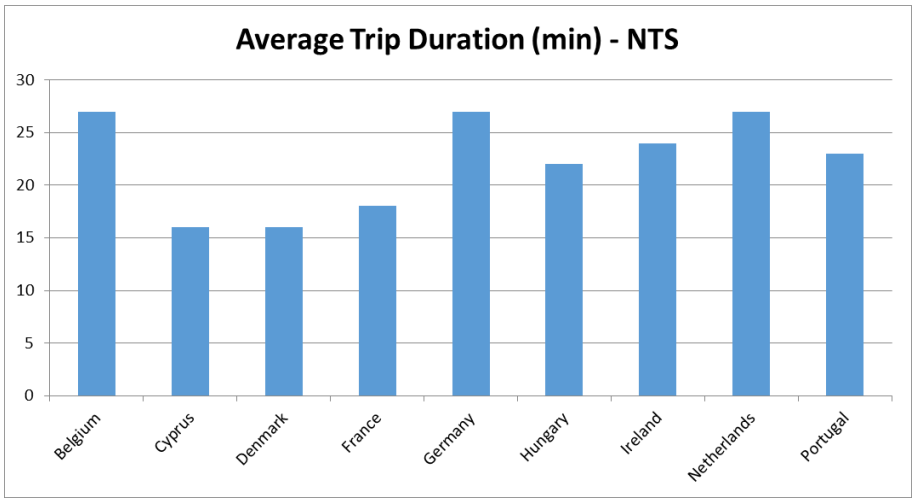
Two other indicators that were considered were the average trip distance and the average trip duration. Looking at NTS data, it is possible to see that the average trip distance across the considered Member States is 13.2 km (Figure 74), while the average duration is 22.2 min. (Figure 75). Belgium is the Member State with the longest average trip distance (16 km), while Portugal had the shortest (10 km). Looking at the trip duration, both Cyprus and Denmark have the shortest trips (16 min.), whereas in Germany, Belgium and the Netherlands trips take 27 min. on average.

Figure 74 - Average trip distance according to the latest available NTS



Source: own elaboration based on NTS data

Figure 75 - Average trip duration according to the latest available NTS

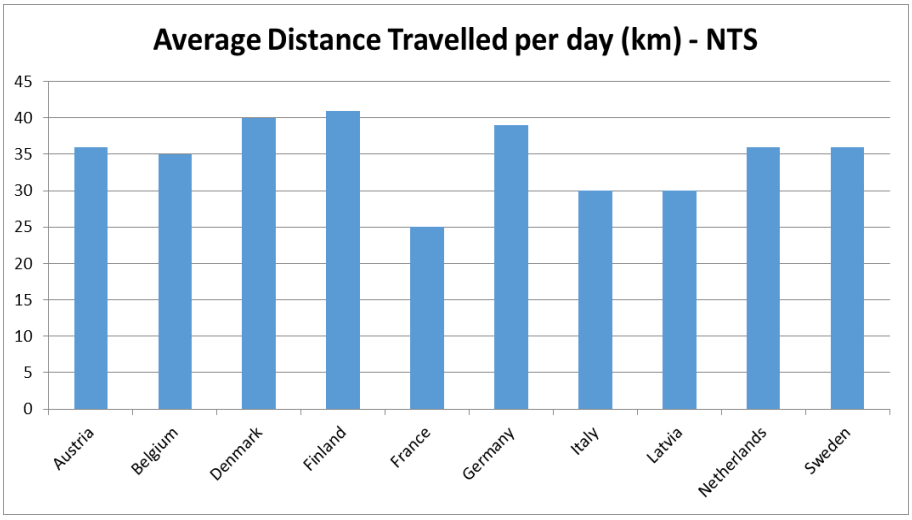


Source: own elaboration based on NTS data

AVERAGE DISTANCE AND TIME TRAVELLED PER DAY

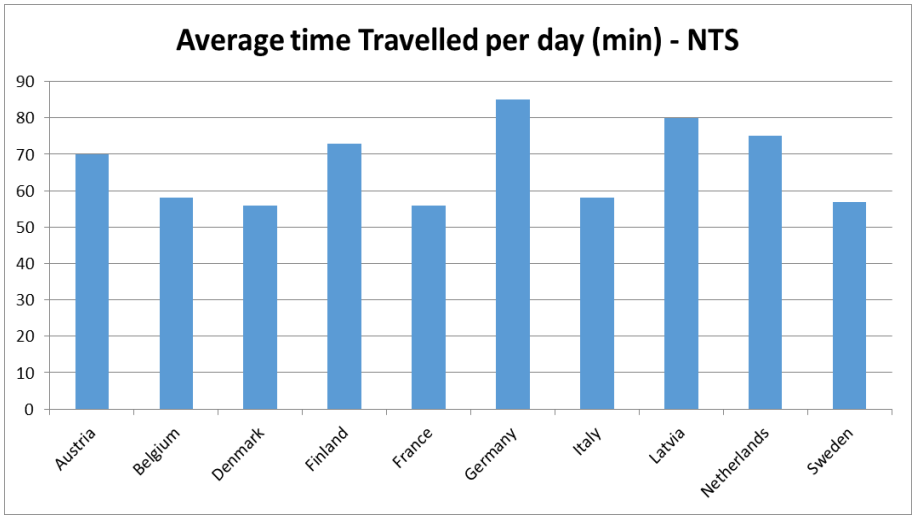
In addition to the average length and duration of a single trip, many NTS also provide information on the average distance and duration travelled during a single day. Looking at the data available (Figure 76), the average distance travelled per day in the 10 Member States is 34.8 km. France had the shortest distance covered (25 km), while citizens in Finland and Denmark travel at least 40 km per day on average. In terms of time spent travelling per day (Figure 77), in five Member States total daily trips last less than an hour (Belgium, Denmark, France, Italy and Sweden). Germans had the highest average trip duration (85 minutes). The average value for the Member States considered is 67 minutes.

Figure 76 - Average distance travelled per day according to the latest available NTS



Source: own elaboration based on NTS data

Figure 77 - Average time travelled per day according to the latest available NTS

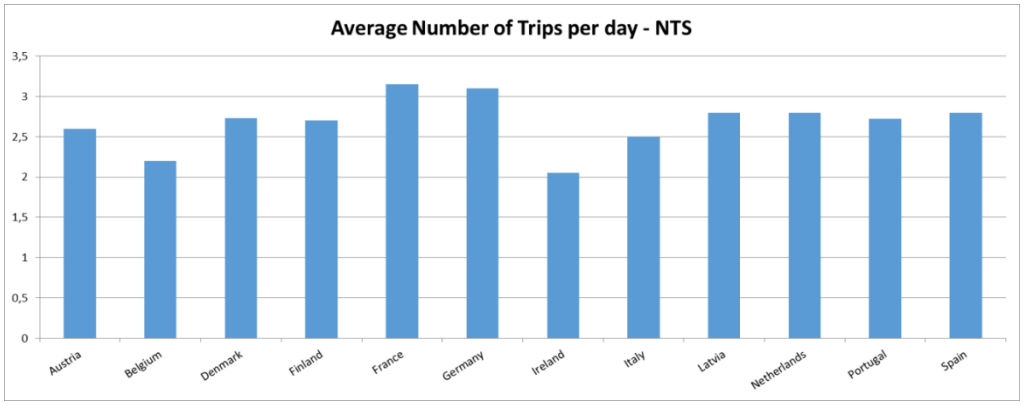


Source: own elaboration based on NTS data

I.2.1 AVERAGE NUMBER OF TRIPS

Finally, the average number of trips taken per day was also extracted from NTS (Figure 78). In this case, the average value lies between 2.5 and 2.8 trips per day, with very similar figures for Austria, Denmark, Finland, Italy, Latvia, Netherlands and Spain. Lower values are visible for Ireland and Belgium (2.05 and 2.2), whilst for France and Germany, values are above three trips per day on average (3.15 and 3.23, respectively). It is important to note that, contrary to travel distance, this measurement of mobility is very sensitive to the type of survey methodology used, because of omitted short trips, for example.

Figure 78 - Average number of trips according to the latest available NTS



Source: own elaboration based on NTS data

I.3 Results from surveys on innovative mobility services

Over the past decade, people's transportation habits have significantly changed as a result of the introduction of innovative mobility systems. In particular, by taking advantage of people's behavioural changes and of recent advances in information and communication technology, shared mobility has continued to grow and has become a significant part of citizens' transport choices.

NTS are seldomly collecting data on shared mobility patterns. A partial reason for this is that the modal share of shared mobility modes is still insignificant at the national scale, compared to the use of more traditional modes. However, a considerable number of surveys on shared mobility have been carried out throughout Europe.

Over the past decade, **car sharing**, a service that allows people to use a car when needed without having to bear the costs and responsibilities of ownership, has increased in popularity and emerged as an alternative to the use of private cars. Relevant surveys have been carried out by the *6-T*[54] multi-year research programme (*Building a Tool for Measuring and Managing Sustainable Mobility*[55]), whose objective is to assess the impact of car sharing services on car ownership rates and travel practices in France[56]. The subscription to the service resulted in less usage of private cars (-31% in terms of number of days used), while increasing the use of bike (+10%), public transport (+6%) and walking (+3%). In addition, 77% of respondents have given up at least one car in their household after becoming car sharing users. As a result, each car sharing vehicle has replaced between five and eight private cars.

Another survey was conducted by the *Berlin Institute Team Red*[57], to assess the impact of shared cars in the city of Bremen in 2017. These results also indicated that the use of car sharing caused a significant increase in the use of environmentally friendly modes of transport and did not motivate users to use cars more frequently. For people who no

[54] https://www.ademe.fr/enquete-nationale-lautopartage-edition-2019

[55] https://6-t.co/en/why-6t/

[56] Survey was conducted in all French cities where at least one of the following car sharing services operate: Citiz, Clem', Modulauto, Communauto, Ubeeqo, et Getaround Connect

[57] https://share-north.eu/2018/05/results-of-impact-analysis-of-car-sharing-services-and-user-behaviour-delivers-interesting-results-in-bremen/

longer own a car because of car sharing, approximately 75% of trips previously made by car were instead made using environmentally friendly modes of transport.

By connecting car owners who have empty seats with travellers sharing the same destination or parts of a trip, **carpooling** is part of the rapidly evolving paradigm shift from vehicle ownership to vehicle usage and shared mobility. In 2018, *BlaBlaCar,* the world's largest carpooling community, conducted a survey[58] on thousands of their members to understand how much CO_2 the carpooling service is capable of saving annually. The survey reported that, on average, BlaBlaCar raised the average car occupancy rate from 1.9 to 3.9 people per car and in total, 1.6 million tonnes of CO_2 were saved by BlaBlaCar carpoolers in that same year**.** In addition, carpooling is capable of cutting passengers' first and last mile trip duration from 24 km to 18 km, as a result of the distribution of carpooling meeting points, compared to traditional transport modes which require travellers to reach a central infrastructure, such a station, a bus stop, an airport, etc.

With the emergence of apps and digital tools, **bike sharing** has also seen a steep increase in popularity. It consists of a service through which bicycles are pooled among multiple users. This has become one of the main new mobility service offerings, especially within larger urban areas, where they contribute to reducing the city's congestion and pollution while offering a sustainable transport solution. Two of the latest bike sharing users' surveys were conducted by *6-T, Ademe*[59] in Paris (*2017*), and *ComoUK*[60]*(2018)* in several UK cities. In both cases, the goal was to understand who uses the shared bike services, what the trips' characteristics are and what the impacts of the innovative shared mode on daily mobility habits are.

In Paris, 63% of users said they walk more than they would have liked to, in order to reach a bike. Moreover, 27% of users confirmed that the shared bike was part of an intermodal trip. In 73% of these cases, public transport was the combined transport mode. Finally, four out of five users expressed that free-floating bike sharing was responsible for a change in their modal choices. In particular, 45% of users said that their utilisation of public transport had increased after joining the bike sharing program, 32% of users walked more and 28% biked more than they did before subscribing to the service.

In London, the survey was useful in understanding the mode shift generated by free-floating bike sharing. Considering the trip, they last made by shared bike, 42% of respondents would have instead walked, 23% would have used the bus and 14% would have used their car. Bike sharing thus emerged as a tool to reduce car trips: 33% said they were using their car either 'much less' (12%) or 'less' (21%).

Ride Hailing consists of booking rides and paying for the car service through a smartphone app with transportation network companies (e.g., Uber of Lyft). Its impacts on cities' volume of automobile traffic has been a widely debated topic, which still has not reached consensual conclusions, nor is it a topic on which there is robust scientific evidence. One of the most relevant users' surveys was carried out in 2019 by *6-T, Ademe*[61] and commissioned by Uber, to understand the influence of the ride hailing service on mobility behaviour in the Paris Metropolitan Region.

The study found that 17% of Uber users' households have gotten rid of (at least) one car since the introduction of the service in the Paris region. While Uber itself does not

[58] https://blog.blablacar.com/newsroom/news-list/zeroemptyseats

[59] https://6-t.co/en/freefloating-bikesharing-paris/

[60] https://como.org.uk/wp-content/uploads/2018/09/CoMoUK-Bike-Share-Survey-2018-WEB.pdf

[61] https://6-t.co/en/impact-uber-idf/

suffice to push a household to reduce car ownership, it played a major role alongside other factors. In particular, households' cars being abandoned correspond to a daily avoidance of between 1.5 and 3 million Vehicle Kilometres Travelled (VKT). During and between rides, Uber drivers generate 2.4 million kilometres per day in Ile-de-France (2.4% of daily regional VKT). Subtracting avoided VTK to generated VKT, the overall impact of Uber is between -0.6% and +0.9%, thus contributing to either a reduction or an increase in regional VKT. In both directions, these impacts (less than 1%) are considered marginal.

Moreover, several survey-based studies on ride hailing [62] administered to 1 000 ride-hailing passengers from the Greater Boston Area analysed how new on-demand mobility services may be substituting travel by other modes. The survey estimated that 59% of ride-hailing trips added a new vehicle to the road, as the trip would otherwise been made with alternative options (public transport, active modes, etc.) or not made at all. The most common reasons to adopt ride-hailing were that this option was considered quicker than public transport (59%), that a number of users did not have access to a vehicle (35%) or that parking was either too difficult or too expensive (23%). Also, in terms of substitution, ride-hailing passengers with higher incomes are less likely to substitute the service for public transport. At the same time, residents of compact neighbourhoods with transport access were more likely to generate new car trips, as their trips would otherwise been made by public transport or active modes.

As new shared mobility services have appeared, people's travel patterns have started diversifying. In the urban geographical context, **shared e-scooters** represent one of the latest and most interesting trends that have emerged. Two users' surveys should be mentioned in this regard. The first one, from *6-T, Ademe*[63]*(2019),* takes into account users of different e-scooter providers in France's three main cities. The study found out that e-scooters users would not have walked (8%) nor biked (7%) in the last e-scooter trip they made if the service had not been available. Instead, they would have used a private car. Also, e-scooters are suited to intermodal practices. 23% of trips were intermodal, meaning they combine the use of e-scooter with that of another transportation mode. In 66% of cases it was public transport, while in 19% it was walking.

The second study is from *ODOXA*[64]*(2019)*, which only takes into account Lime's users in Paris and surroundings. The main objectives of the survey was to identify the profile of free-floating e-scooter users, to describe their usage, understand the determinants and obstacles to the use of this new mode of transport and to analyse its impacts on mobility practices. In terms of impacts, 59% of Lime users have replaced, at least in part, their usage of a motorised vehicle. In particular, a third of users declared that the e-scooter allowed them to make a trip that they would have otherwise made by private car. Moreover, the usage of a shared e-scooter incentivised the adoption of other sustainable transport modes and to abandon the most polluting ones.

Finally, the development of more efficient modes of transportation has led to the appearance of new niches of transport modes and services and to a more intuitive integration of different modes, to simplify the users' journey experience. The concept of **MaaS (Mobility as a Service)**[65] refers to the integration of various forms of transport services into a single mobility service accessible on demand. Its aim is to help users navigate among the combinations of transport services available. This makes mobility

[62] https://journals.sagepub.com/doi/pdf/10.1177/0361198118821903

[63] https://6-t.co/en/etudes/uses-and-users-of-free-floating-e-scooters-in-france/

[64] http://www.odoxa.fr/wp-content/uploads/2019/04/Odoxa-pour-Lime-avril2019.pdf

[65] https://www.maas4eu.eu/

effortless and intuitive, as shown by quantifiable evidence about MaaS costs and benefits in three real-life, complementary pilot cases, demonstrating the concept in urban, intercity and cross-border trips at three EU areas. One of the few available user surveys on MaaS was conducted by *Chalmers University*[66]*(2020)*, among around 200 individuals who subscribed to the service in the city of Gothenburg, to understand their reasons for joining the service, the affected travel behaviour and identify future opportunities.

[66] https://research.chalmers.se/en/publication/234926

Annex II: Methodological approach

This chapter provides an overview of the methodology used throughout the survey, including information about how the data collection, processing, weighting and the data analysis was conducted.

II.1 Questionnaire

The questionnaire was made "device agnostic" meaning that the respondent could open and answer the questionnaire on all kind of devices (PDA, iPad, PC, etc.). The questionnaire was translated in the official language of each Member State.

The structure was organised in four sections, as follows:

- Section 1 included sociodemographic questions about the respondent and his/her household (questions numbered Q00 to Q15): it included questions about gender, age, educational level, occupational status, the respondent's household characteristics and availability of vehicles in the household. This section aimed to get an overview of the respondent and his/his household functioning.
- Section 2 included mobility questions and the travel diary information, followed by questions related to the effects of the COVID-19 pandemic (questions numbered Q16 - Q18) and travel diary questions (name of the questions start by T for questions related to trips or S for questions related to the trips stage): it included questions about trip performed the day before. In this section, the objective was to collect information on the respondent's mobility.
- Section 3 included vehicle fleet description (questions numbered V0101-V0503): This part included questions related to the vehicles used, for example, the brand, the fuel type, engine size. This section aimed at understanding characteristics of the vehicle(s) involved.
- Section 4 included questions on new mobility patterns information and income (questions numbered Q19-25): this part collected information on the services present and used in a specific region, such as ride hailing, car sharing, as well as the annual disposable household income. The objective of this section was to gather information on the new mobility behaviours.

II.2 Target population and sample size

The target population for this travel survey was citizens between the ages of 15 and 84 years old. Based on the recommendations of the Eurostat guidelines on Passenger Mobility Statistics and considering the desired accuracy of the results (in terms of margin of error no larger than 3% at a confidence level of 95%), the following target numbers of interviews in terms of individuals per Member State were defined.

Table 17 - Target sample size in terms of individuals

EU-27 Member States	Sample target	EU-27 Member States	Sample target
Belgium	4268	**Lithuania**	2134
Bulgaria	2301	**Luxembourg**	1067
Czechia	3201	**Hungary**	3201
Denmark	3201	**Malta**	1067
Germany	9604	**Netherlands**	5335
Estonia	4268	**Austria**	3201
Ireland	2134	**Poland**	6402
Greece	4268	**Portugal**	4268
Spain	7469	**Romania**	5335
France	8536	**Slovenia**	1067
Croatia	2134	**Slovakia**	3201
Italy	8535	**Finland**	3201
Cyprus	1067	**Sweden**	4268
Latvia	1067	**Total**	105800

Source: DG MOVE, European Passenger Mobility Survey, 2021

II.3 Data collection

MODE OF DATA COLLECTION

The survey fieldwork was carried out mainly using Computer Assisted Web Interviewing (CAWI). For Cyprus, Malta, Luxembourg and Greece, CAWI methodology was combined with Computer Assisted Telephonic Interviewing (CATI) to reach the older population in certain Member States (who are considered more hard-to-reach population groups via CAWI), to meet the defined target. A concrete example was the older group in Greece who could not be reached through web-interviewing modes, but more easily via telephone.

An overview of the methodology used in each EU-27 Member State is presented in Table 18. Table 19 provides the distribution of interviews by type.

Table 18 - Type of interviews used for each MS

EU-27 Member States	CAWI	CATI	EU-27 Member States	CAWI	CATI
Belgium	X		**Lithuania**	X	
Bulgaria	X		**Luxembourg**	X	X
Czechia	X		**Hungary**	X	
Denmark	X		**Malta**	X	X
Germany	X		**Netherlands**	X	
Estonia	X	X	**Austria**	X	
Ireland	X		**Poland**	X	
Greece	X		**Portugal**	X	
Spain	X		**Romania**	X	
France	X		**Slovenia**	X	
Croatia	X		**Slovakia**	X	
Italy	X		**Finland**	X	
Cyprus	X	X	**Sweden**	X	
Latvia	X				

Source: DG MOVE, European Passenger Mobility Survey, 2022

Table 19 - Number and type of interviews for each MS

	Number of interviews			Distribution	
EU-27 Member States	**CATI**	**CAWI**	**Total**	**CATI**	**CAWI**
Belgium	0	7 769	7 769	0.0%	100%
Bulgaria	0	4 574	4 574	0.0%	100%
Czechia	0	6 404	6 404	0.0%	100%
Denmark	0	7 122	7 122	0.0%	100%
Germany	0	22 750	22 750	0.0%	100%
Estonia	0	8 165	8 165	0.0%	100%
Ireland	0	4 922	4 922	0.0%	100%
Greece	315	8 380	8 695	3.6%	96.4%
Spain	0	13 534	13 534	0.0%	100%
France	0	19 579	19 579	0.0%	100%
Croatia	0	3 910	3 910	0.0%	100%
Italy	0	17 821	17 821	0.0%	100%
Cyprus	1 209	676	1 885	64.1%	35.9%
Latvia	0	1 892	1 892	0.0%	100%
Lithuania	0	4 052	4 052	0.0%	100%
Luxembourg	1 108	918	2 026	54.7%	45.3%
Hungary	0	5 885	5 885	0.0%	100%
Malta	2 830	1 059	3 889	72.8%	27.2%
The Netherlands	0	13 304	13 304	0.0%	100%
Austria	0	7 096	7 096	0.0%	100%
Poland	0	12 286	12 286	0.0%	100%
Portugal	0	8 264	8 264	0.0%	100%
Romania	0	11 604	11 604	0.0%	100%
Slovenia	0	2 404	2 404	0.0%	100%
Slovakia	0	6 811	6 811	0.0%	100%
Finland	0	6 488	6 488	0.0%	100%
Sweden	0	9 709	9 709	0.0%	100%
Total	5 462	217 378	222 840	2.5%	97.5%

Source: DG MOVE, European Passenger Mobility Survey, 2022

II.4 Sampling design

CAWI SAMPLE

CAWI was chosen as the main data collection source (given the large sample size required and the available budget). The population for online sampling is defined as citizens living within an EU Member State and having access to the internet. The sample frame was built using the list of individuals having opted-in (online) themselves to participate in CAWI surveys. These individuals had confirmed their interest in participating in multiple surveys (not only on transport but on various themes), registered accordingly (via e-mail) in the panel database of the panel agency and were invited to participate in this particular survey. The number of members of online panels in older age groups (50-84) is limited for certain Member States, but ultimately, the percentage of interviews completed was consistent with a representative sample for each Member State.

The sample was created by random sampling: individuals were randomly drawn from the online population participating in panels and invited to participate in the survey. Ex-ante sampling targets per Member State have been set on the pre-defined demographic age groups[67]: 15-17 years, 18-29 years, 30-49 years, 50-64 years and 65-84 years, and also on the basis of gender. When (at Member State level) a target of a demographic group was met, no more invites were sent to panel members of this particular demographic age group.

While the population from the panels gave their permission to be contacted via e-mail, the respondent had the option whether or not to participate in the survey at any time, or even drop out of the survey.

Interviews where individuals completed the entire survey are counted as completed interviews.

CATI

The sample frame for Computer Assisted Telephonic Interviewing (CATI) was built via the Random Digit Dialling (RDD) methodology. This method consists of generating random telephone numbers and calling these numbers. RDD sampling does not provide information on the specific age or gender of the contact, as the numbers are generated at random. The sample frame was then created based on a 1:20 oversampling (20 numbers were generated for each interview expected in the target).

When a respondent completed the questionnaire, he/she was automatically registered under the age quotas described above until all quotas were completed.

In cases where the sample did not suffice, additional sample records were uploaded based on the 1:20 oversampling ratio, such as oldest age group.

[67] The age groups are different from Eurostat (0). The reason was to limit the number of quotas as much as possible. Using the broad age groups limits the quota to 8 per country (4 age groups per gender).

II.5 Fieldwork

The data collection was performed over a period of 21 weeks, starting on 19 March 2021 until 8 August 2021. After the delivery of the translations, a process of reviewing the translations and making a few adjustments delayed the start of the fieldwork in some Member State. The CAWI fieldwork was originally planned to start on 19/03/21 for Ireland (as English was used) and on 29/03/21 for the other Member States. For the Member States having ex-ante CATI[68] involved (Cyprus, Malta, Luxembourg), the start date was set for 20/04/21. The actual start dates of the fieldwork per Member State are reported in Table 20.

Table 20 - Start and end dates for each Member State

CAWI					
EU-27 Member States	**Start Date**	**End Date**	**EU-27 Member States**	**Start Date**	**End Date**
Belgium	26/03/2021	26/07/2021	**Lithuania**	30/03/2021	08/08/2021
Bulgaria	16/04/2021	17/07/2021	**Luxembourg**	20/04/2021	04/08/2021
Czechia	04/04/2021	15/07/2021	**Hungary**	29/03/2021	27/07/2021
Denmark	29/03/2021	26/07/2021	**Malta**	20/04/2021	04/08/2021
Germany	01/04/2021	28/07/2021	**Netherlands**	26/03/2021	12/07/2021
Estonia	16/04/2021	28/07/2021	**Austria**	01/04/2021	27/07/2021
Ireland	19/03/2021	27/07/2021	**Poland**	29/03/2021	30/07/2021
Greece	29/03/2021	04/08/2021	**Portugal**	29/03/2021	04/08/2021
Spain	04/04/2021	09/07/2021	**Romania**	29/03/2021	16/07/2021
France	26/03/2021	26/07/2021	**Slovenia**	05/04/2021	27/07/2021
Croatia	30/03/2021	26/07/2021	**Slovakia**	16/04/2021	05/08/2021
Italy	01/04/2021	28/07/2021	**Finland**	31/03/2021	26/07/2021
Cyprus	20/04/2021	05/08/2021	**Sweden**	29/03/2021	26/07/2021
Latvia	16/04/2021		01/07/2021		
CATI					
EU-27 Member States	**Start Date**	**End Date**	**EU-27 Member States**	**Start Date**	**End Date**
Greece	25/06/2021	30/07/2021	**Luxembourg**	20/04/2021	29/07/2021
Cyprus	20/04/2021	18/07/2021	**Malta**	20/04/2021	28/07/2021

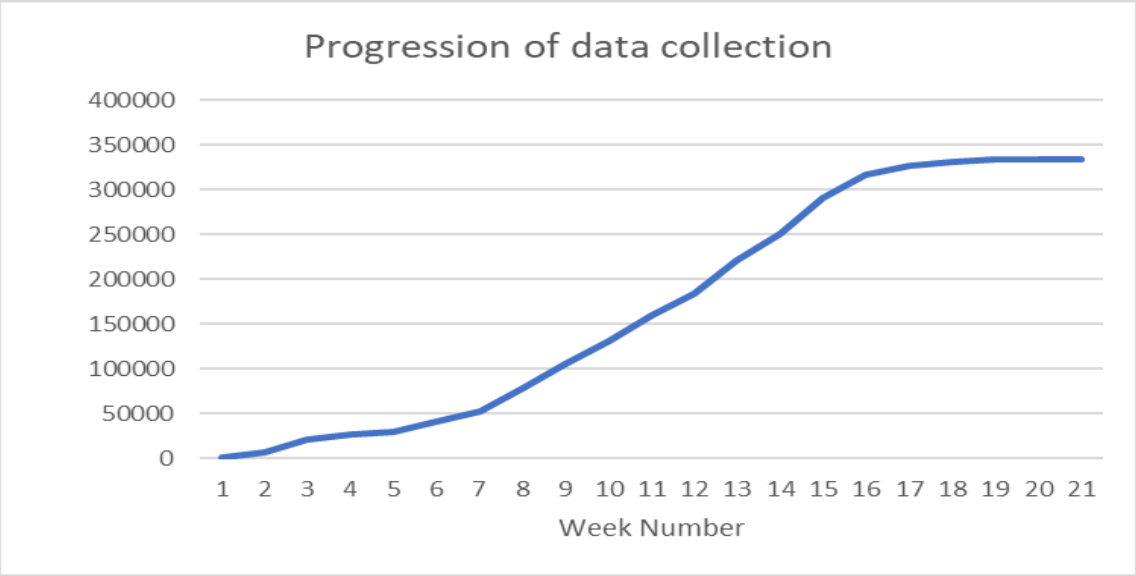
Source: DG MOVE, European Passenger Mobility Survey, 2022

As shown in the table, the fieldwork end date was July for the most Member States, although for some of them, the end date ran into early August due to incomplete quotas of the 65-84 age group which required more time to complete.

[68] It was decided beforehand because we knew that the online panel is limited for these Member States and that the collection would not be completed for these Member States using only the CAWI method.

Figure 79 shows the progression of the data collection of the completed interviews plus dropouts[69]. There was a gradual increase of the response rate from week 1 to week 15, after which each Member State's target was close to being reached.

Figure 79 - Data collection (CATI&CAWI) progression (Completes and dropouts)



Source: DG MOVE, European Passenger Mobility Survey, 2022

During the execution, the fieldwork was constantly monitored by:

- Inviting potential respondents to participate in the survey, trying to yield an equal number of completed surveys per weekday per Member State.
- Continuously tracking the demographics, i.e. age and gender, per Member State.
- Continuously adapting the number of individuals to be surveyed per week after the data validation and data checks. The data checks were made once every 2 weeks and those interviews failing the checks had to be replaced with new interviews.
- Checking the completion of surveys amongst older age groups via CATI in certain Member States (such as Greece, Cyprus, Luxembourg and Malta).

[69] Drop outs are respondents that started the survey, but did not complete it (N.B: screen outs are not included in the drop outs).
Screen outs are respondents that are filtered from the questionnaire because they do not fit the target group or quota per age or gender is already full. In this survey the only screener question was on age. If respondents enter an age that is not from 15 to 84, then they were filtered out.

NUMBER OF COMPLETED INTERVIEWS

In total, 111,525 interviews were completed. Table 21 shows the number of completed interviews.

Table 21 – Number of completed interviews

EU-27 Member States	Completed surveys
Belgium	4392
Bulgaria	2377
Czechia	3265
Denmark	3301
Germany	9884
Estonia	4358
Ireland	2179
Greece	4829
Spain	8081
France	8826
Croatia	2183
Italy	9112
Cyprus	1129
Latvia	1120
Lithuania	2223
Luxembourg	1148
Hungary	3259
Malta	1113
Netherlands	5646
Austria	3284
Poland	6714
Portugal	4793
Romania	5934
Slovenia	1131
Slovakia	3396
Finland	3323
Sweden	4525
Total	111525

Source: DG MOVE, European Passenger Mobility Survey, 2022

II.6 Data processing

This section presents the data processing methods used to ensure that the final database is fit to serve the intended use in a particular context. The main steps of data processing included data cleaning and data enrichment.

- Data cleaning is the process of detecting and correcting or removing inaccurate data from the dataset.
- Data enrichment is a process when new information is created at any level and added to the raw data as supplementary variables: for example, the information whether the respondent lives in an urban area or not, is created with the postcode of the place of residence.

The different elements of the data processing procedures cannot be strictly separated because they are interdependent and continuously processed.

DATA PROCESSING ON SOCIO-DEMOGRAPHIC AND VEHICLE FLEET DESCRIPTION QUESTIONS

The first step was the detection of outliers, i.e. data that differs significantly from other observations (e.g. for the household size, number of cars, number of motorcycles/ mopeds, number of bikes and number of electric personal devices).

Inconsistencies between answers of the same respondent were individually analysed along with the trip diary to determine the plausibility of the data. For instance, respondent number 1448420, is 68 years old, retired, has four people in his/her household, all over the age of 15, his/her household type is 'couple with children' and the household has 30 cars, 22 motorbikes, two bicycles and zero EPV with no information recorded on his/her income and he made no trips. 14 such cases (out of 111525) were identified and removed from the subsequent analysis.

Further checks were conducted when the household size or the numbers of cars or the number of bikes were unrealistically high, to determine if it was a typing error or due to other reasons (in some cases, household sizes or number of vehicles was high due to cohabitation). When typing errors were found, an imputation by hot-deck by class was performed (Andridge & Little, 2010). This method consists of replacing missing values with values from a similar observational unit. In order to establish the similarity, homogeneous classes are built (for instance by crossing age groups, gender, etc.).

Table 22 lists the variables subject to imputation and the variables used to build the similarity classes.

Table 22 - Construction of classes for imputation

Variables being imputed	Variables used to build similarity classes
Q07: Number of people in household	Member State, degree of urbanisation, type of household, having children aged< 18 years, gender
Q12: Number of cars	Member State, degree of urbanisation, type of household, gender
Q14: Number of bikes	Member State, degree of urbanisation, type of household, gender

With these controls, there was a limited number of imputations:

- Ten for the household size
- Three for the number of cars;
- One for the number of bikes.

This shows that participants provided reasonable responses to the demographic questions of the survey.

DATA CORRECTION ON TRIP DIARY QUESTIONS

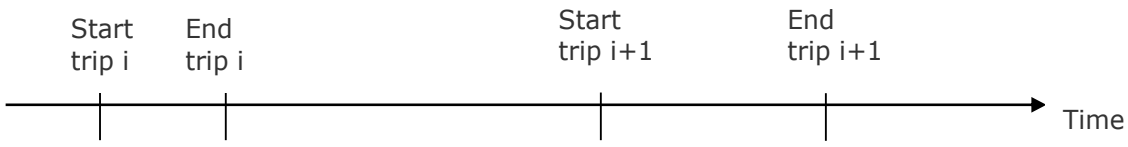
This section presents the corrections performed on the data records reporting details on trips reported by respondents. This dataset contains information for the 70.5% of respondents who performed at least one trip.

Trips chronology

Firstly, a verification of the trip start time and trip end time was carried out. A trip start time should be earlier than a trip end time. A trip end time should be earlier than the start time of the next trip.

A correct reporting of temporal trips sequence is exemplified in Figure 80:

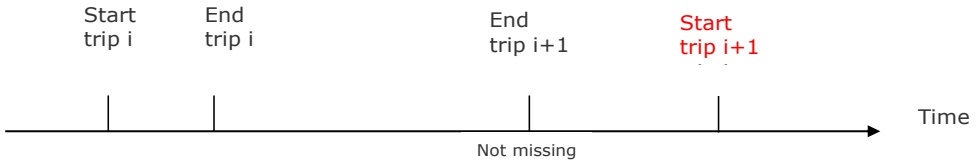
Figure 80 - Illustration of a correct trip sequence



With the intention of amending an incorrect trip, different scenarios were foreseen:

- In cases when the start time for a trip i+1 was later than the end time of the same trip and the end time of trip i was reported (see Figure 81), the start time of that trip i+1 was defined as the end time of previous trip i. This is because, undoubtedly, all trips must have a start and end time and the start time of a trip i+1 must be greater than or equal to the end time of trip i. However, having no additional information on the incorrect start time, it was assumed that it was equal to the end time of the previous trip i.

Figure 81 - Illustration of an incorrect trip sequence: wrong start trip time



If a trip start time i+1 was reported, and one of the two following cases:

- when trip end time i was later than trip end time i+1 (See Figure 82),
- when trip end time i was earlier than trip start time i (See Figure 83),

The end time of trip i was defined as the start time of trip i+1.

Figure 82 - Illustration of an incorrect trip: wrong end trip time (after end trip i+1)

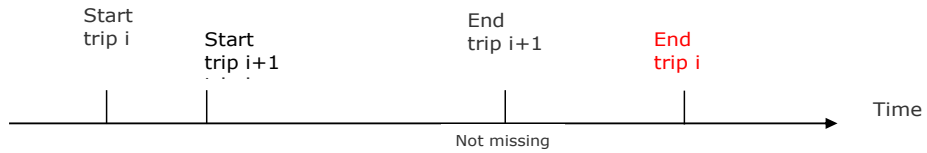
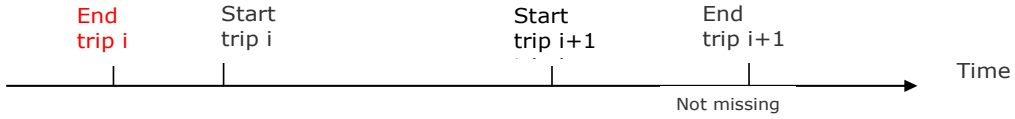


Figure 83 - Illustration of an incorrect trip: wrong end trip time (before start trip i)



Secondly, the post codes were verified and corrected for each trip as follows:

- If the origin post code and the origin city of trip i+1 were absent, but the destination post code for trip i was present, then the missing origin post code for trip i+1 was replaced by the destination post code for trip i.
- If the destination post code and destination city of trip i were not declared but the origin post code for trip i+1 was present, then, the missing destination post code for trip i was replaced by the origin post code for trip i+1.

The post code of respondent's living place was assigned to the missing post code if:

- the trip destination post code was absent and the trip purpose was 'return home';
- the trip origin post code was missing and the trip was the first of the day.

Coherence with trips purpose

Furthermore, assuming an error in data entry or encoding (e.g. the respondent wanted to enter one trip and by error he entered a series of identical trips), a trip record was deleted in the following cases:

- consecutive trips with 'return home/secondary home' as trip purpose and with missing distance and missing start/end times;
- the trip had the same departure and arrival time of the previous recorded trip and trip purpose and distance were also the same or were missing;
- the trip had distance, trip purpose, departing and arrival time equal to zero or missing or the same as the previous recoded trips;
- consecutive trips with 'return home/secondary home' as trip purpose and distance and start/end zip codes same as the above record;
- consecutive trips having same trip purpose with missing distance and start/end times;
- trip purpose and distance being the same as the previous record or missing and start/end time available but the same as the row above;
- a trip purpose the same as above or the trip purpose being 'return home/secondary home' or the same as above or missing, trip distance equalled to 0 or missing or as above and start/end time and zip codes were either same as above or missing;
- the trip purpose was missing and the trip purpose of the previous recorded trip was 'return home/secondary home'.

Trips Speed

Some trip distances were missing while the stage distances were present. Thus, if the trip distance was missing or equal to zero or smaller than the sum of the stage distances, it was replaced by the sum of the stage distances in order to have a more coherent value for the trip and the stages.

The speeds by travel mode all trips considered, were calculated using the initial trip distances and durations. A comparison was made between the calculated speed and the speeds based on the kernel density estimation to see if it was plausible (see Table 23). If the calculated speed was not in between the minimum and the maximum speeds (Table 23), using kernel density estimation observations[70], it was declared as unlikely. The median speed of the trip mode was used instead of the mean because it isn't influenced by extremely large values (See Table 23).

Thus, to rectify errors regarding trip distances:

- a new distance was calculated using the formula: distance = median speed of the trip mode * trip duration;
- if duration was missing because either start or end time was missing and if the trip distance was not missing then, using the median speed of the trip mode, a trip duration was calculated;
- if duration was 0 and distance was over 0.1 km, using the median speed of the trip mode, a trip duration was imputed.

[70] Kernel density estimation is a technique that enables the user to better analyse the distribution and can give valuable indication of features such as skewness in the data Terrell, George R., and David W. Scott. "Variable kernel density estimation." *The Annals of Statistics* (1992): 1236-1265.

Table 23 - Median, minimum and maximum speeds of different travel modes

Travel modes/ Travel sub modes	Median Speed (km/h)	Minimum speed (km/h)	Maximum speed (km/h)	Mean speed (km/h) after correction[71]
101: Walking	4.3	2	10	4.6
102: Skate/ Rollerblade/scooter	8	5	30	10.1
103: Electric personal transportation device	10	5	30	11.4
104: Wheelchair	6	4	8	7.8[72]
2: Bicycle	10	5	45	12.7
3: Car/ light commercial vehicle as driver	24	10	130	32.3
4: Car/ light commercial vehicle as passenger	24	10	130	32.5
406: Taxi and ride hailing (Uber/Lyft, etc.)	16	10	90	23.1
5: Motorcycle/ moped as driver	16	10	130	24.5
6: Motorcycle/moped as passenger	16	10	130	24.7
701: Bus or trolleybus	11	5	35	13.3
702: School bus	16	5	80	21.7
703: Tramway	10	5	70	13.2
704: Metro	11	5	80	15.1
705: Suburb train	26	15	120	34.3
706: Cable car or a funicular railway	15	10	95	24.8
801: High speed train	55	25	350	70.0
802: Other train	41	20	145	47.5
803: Coach	31	10	150	36.4
804: Aircraft	230	150	900	420.1
805: Boat	17	5	150	27.0
806: Other	12	5	100	20.2
807: Passenger in specialised transportation	12	5	80	18.6
808: Lorry/ Van/Tractor etc.	31	10	90	38.7

[71] The mean speeds after correction are the new speeds calculated from the new distances and new durations after correction.

[72] Including motorised

Source: DG MOVE, European Passenger Mobility Survey, 2022

Last trip purpose

For their first trip, 93.4% of respondents departed from home. However, 13.9% of the last trips do not have a 'return to home' trip. Thus, in order to have approximately an equal number of departures from home and return to home, a last trip with trip purpose 'return to home' was added for 4.1% of the respondents (whose last trip wasn't a return to home trip).

The respondents who had a last trip 'visiting a friend/relative', were excluded from the list as the respondent could stay at their friends' or relatives' place.

II.7 Weighting procedures

Generally, the weighting procedures rely on calibration of margins. Calibration consists of adjusting the original (sample) weights[73] so that the reweighted sample conforms to known population external totals. The method forces the estimates to equalise population parameters (e.g. the totals of population in territorial domains), which may be available from an auxiliary source such as administrative data, or from statistical sources such as population Censuses (Eurostat, 2020).

This stage is essential to ensure a representative sample and comparison with some other statistical sources (e.g. other national surveys). The calibration on margins must be implemented both on variables which explain (or are correlated with) transport behaviour, and also on the variables that explain the non-response mechanism for which the total is accurately known (Deville & Särndal, 1992).

CALIBRATION ON MARGINS TO FIND THE REFERENCE POPULATION

The Eurostat Guidelines for Passenger Mobility Statistics (2019) recommend a calibration on the following variables: age band (every five-year interval, starting from age 15 to age 84), gender, day of week and spatial distribution of the population. Given that a lot of information was available from external sources (demo_pjan, ilc_lvps04, ilc_lvho01, ilc_lvho01), we had to choose those that we would use to weight the respondent sample. A linear regression was used in order to determine the calibration variables among all variables that we had from other sources. The variables which were more correlated with the variable 'number of trips' were chosen. The list of variables we tested were:

- Gender * Age (Male / Female * 15-19 / 20-24 / 25-29 / …. / 70-74 / 75-84).
- DEGURBA (Degree of urbanisation: Individual living in: cities / towns and suburbs / Rural areas).
- Household size (one person / two persons / three persons / four persons or more).
- DEGURBA * Household size.
- Education level (Short-cycle tertiary education or lower / Bachelor or equivalent or further).
- Day of trips description (Monday / Tuesday / Wednesday / Thursday / Friday / Saturday / Sunday).

The significant variables in the model that were chosen to be the calibration variables were: Gender * Age, degree of urbanisation (DEGURBA), Household size, Education level and Day of trips description.

[73] Original weight is the total population of a Member State divided by the number of interviews.

All the margins came from the Eurostat databases available on the Eurostat website. Indeed, with Eurostat databases we had the following information:

- Age x gender extracted from the database on population (national level) demo_pjan (2020).
- Education level extracted from the database on Income and living conditions: ilc_lvps04 (2019).
- DEGURBA extracted from the database on Income and living conditions: ilc_lvho01 (custom) (2019).
- Size of household extracted from the database on Income and living conditions: ilc_lvho01 (custom) (2019).

To run this stage, the package 'sampling' from the software R was applied.

Ideally, an identical calibration for each Member State should have been applied. However, some Member States had a small sample size (less than 2 000 respondents). In this case, a calibration on these many possible variables was not optimal, either some variables had to be removed or some categories had to be aggregated. More precisely, the rules for the choices of calibration are detailed in the Table 24.

Table 24 - Rules for the choice of the calibration method

Variables	Rules	MS
Age x gender Female: 15-19 / 20-24 / 25-29 / …. / 70-74 / 75-84 Male: 15-19 / 20-24 / 25-29 / …. / 70-74 / 75-84	If all categories have at least 19 respondents, calibrate on all categories	EE, EL, IT
	If there are less than 19 respondents between 80 and 84 old (for each gender), regroup the age group [75 ; 79] with the class [80 ; 84]	BE, CZ, DK, DE, ES, FR, CY, LT, NL, AT, PT, RO, FI, SE
	If there are less than 19 respondents between 75 and 84 old (for each gender), regroup the age group [70 ; 74] with the class [75 ; 79] and the class [80 ; 84]	BG, IE, HR, LV, LU, HU, MT, PL, SI, SK
DEGURBA 1. Cities 2. Towns and suburbs 3. Rural areas	If all categories have at least 50 respondents, calibrate on all categories	BE, BG, CZ, DK, DE, EE, IE, EL, ES, FR, HR, IT, CY, LV, LU, HU, MT, NL, AT, PL, PT, RO, SI, SK, FI, SE
	If there is a category with less than 50 respondents, regroup the classes "degurba=1" with "degurba=2"	LT
Education Short-cycle tertiary education or lower Bachelor or equivalent or further	If the sample size is higher or equal to 2000, education is included in the calibration	BE, BG, CZ, DK, DE, EE, IE, EL, ES, FR, HR, IT, LT, LU, HU, NL, AT, PL, PT, RO, SK, FI, SE
	If the sample size is lower than 2000, education is excluded in the calibration	CY, LV, LU, MT, SI

II.8 Representativeness of the sample and accuracy of the results

The results of the survey presented in this report are elaborations of responses provided by a sample of more than 111 000 individuals in the EU-27 (From 1113 respondents in Malta to 9884 in Germany). A stratified sample was defined rather than a simple random sample in order to increase the efficiency of the estimates.

As described in subsection II.2 of this report, the country samples obtained from the survey are representative of the total population. In most cases, the share of each group is basically the same in the sample as in the population, with very limited discrepancies.

Finally, the structure of the sample generally approximates the structure of the population. In either case, all results displayed in the report consider the differences in population and sample composition by weighting the individual data with the ratio between the share of the group the individual belongs in the population and the share of the same group in the sample (section II.7 of this report).

However, sampling survey results are associated to confidence intervals around estimates. The width of these intervals depends on the sample size and on the value and distribution of the target variable under estimation in the population. For further analysis, if the sample is too small (less than 30 people), it is recommended to combine modalities to get a larger sample.

Referring to the estimation of a frequency P (which is actually subject to some survey questions e.g. the share of individuals owning a car, the share of individuals using public transport for their most frequent trip, the share of long-distance travellers making more than 6 trips per year, the share of respondents supporting road charging, etc.) the confidence intervals for various sample sizes are shown in Table 25.

Table 25 - Half-width of the confidence intervals around the estimates of a proportion at a confidence level of 95% for various sample sizes and various proportions

Sample size	P= 50%	P= 40%	P= 30%	P= 20%	P= 10%	P= 5%
5000	1%	1%	1%	1%	1%	1%
3000	2%	2%	2%	1%	1%	1%
1000	3%	3%	3%	2%	2%	1%
500	4%	4%	4%	4%	3%	2%
100	10%	10%	9%	8%	6%	4%
50	14%	14%	13%	11%	8%	6%
30	18%	18%	16%	14%	11%	8%

When a country uses a sample of 5,000 respondents, if the estimated value indicates a proportion of 20% (e.g. 20 % of people use the public transport), this means that the real population value lies in the interval [19 % -20%] in 95% of cases[74].

[74] Eurostat (2008): Eurostat sampling reference guidelines - Introduction to sample design and estimation techniques (p.26)

https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/ks-ra-08-003

If a sub-sample is considered, the confidence interval will be wider. For example, if the sub-sample count 100 respondents, an estimated frequency of 40%, indicates that the actual population value is 95% likely to be in the range of 30% to 50% (±10%). These confidence intervals should be considered when analysing the results of a particular segment, e.g. for respondents who live in a specific area.

II.9 Data analysis method

All the passenger mobility indicators provided in this report are calculated based on weighted data, in a similar manner as in the Eurostat guidelines on Passenger Mobility Statistics (page 32). An example of the calculation for the number of trips per person per day in presented below.

CALCULATION EXAMPLE FOR THE NUMBER OF TRIPS PER PERSON PER DAY

Where

$w_{i,d}$: the weight of the individual i that replies for the day d (d could be one of the following day: Monday or Tuesday or …. Friday or Saturday or Sunday)

- i is the i[th] individual that belong to the respondent sample
- d: day (Monday or Tuesday or …. Friday or Saturday or Sunday (bank holiday should be considered as a Sunday))

$t_{i,u,d,m,p}$: Number of trips made by the individual i that living in localisation u, on the day d, with mode m and for the purpose p

- u: type of localisation (Urban mobility or Total mobility)
- m: mode (car as driver; car as passenger; taxi (as passenger); van/lorry/tractor/camper; motorcycle and moped; bus and coach; train; aviation; waterways; cycling; walking; other)
- p: purpose (work; professional/business; education; shopping; escorting; leisure; personal business)

Note: $t_{i,d,m,p,u}$ is equal to 0; 1; 2 … (e.g. 1: if the individual i makes one trip on the day d with mode m and for the purpose p)

For: Number of trips per person/day (working day and Urban mobility <100Km): $M_{\substack{d=Monday\ to\ Friday \\ u=\text{Urban mobility}}}$

$$M_{\substack{d=Monday\ to\ Friday \\ u=\text{Urban mobility}}} = \frac{\sum_{d=Monday\ to\ Friday}^{i \in r} \sum_{\substack{d=Monday\ to\ Friday \\ u=\text{Urban mobility} \\ m=all \\ p=all}}^{i \in r} w_{i,d} * t_{i,u,d,m,p}}{\sum_{d=Monday\ to\ Friday}^{i \in r} w_{i,d}}$$

For: Number of trips per person/day (Non-working day and Urban mobility <100Km): $M_{\substack{d=\text{Non-working day} \\ u=\text{Urban mobility}}}$

$$M_{\substack{d=\text{Non-working day} \\ u=\text{Urban mobility}}} = \frac{1}{(number\ of\ non-working\ day)} \left(M_{\substack{d=satday \\ u=\text{Urban mobility}}} + M_{\substack{d=Sunday \\ u=\text{Urban mobility}}} \right)$$

Note: that the number of non-working days is generally 2 (unless there is a bank holiday).

For: Number of trips per person/day (all day and Urban mobility <100Km):

$$M_{\substack{d=\text{all day}\\ u=\text{Urban mobility}}} = M_{\substack{d=all\ \text{day}\\ u=\text{Urban mobility}}} = \frac{1}{365}\Big(number\ of\ working\ day * M_{\substack{d=Monday\ to\ Friday\\ u=\text{Urban mobility}}} + number\ of\ saturday * M_{\substack{d=satday\\ u=\text{Urban mobility}}} + number\ of\ sunday * M_{\substack{d=Sunday\\ u=\text{Urban mobility}}}\Big)$$

Tables are generated for each indicator and the graphs are produced in Excel.

Annex III: Additional Tables

III.1 Passenger kilometres for all reference population per year

SHORT-DISTANCE MOBILITY

Table 26 - Passenger-kilometres (10^9pkm) performed by the entire reference population, per year, by main travel mode

MS	car (total)	car as driver	car as passenger	taxi as passenger	van/lorry/tractor/camper	motorcycle/moped	bus and coach	metro/tram/light rail	train (total)	aviation	waterways	cycling	walking	other/unknown
EU	2670	2179	492	17	6	68	123	57	124	2	2	188	207	102
BE	60	49	11	0	0	2	2	2	3	0	0	5	3	3
BG	33	24	10	0	0	0	5	1	1	0	0	1	6	5
CZ	65	50	14	1	0	1	5	3	6	0	0	4	7	3
DK	30	24	6	0	0	2	1	0	2	0	0	4	3	4
DE	413	348	65	1	2	11	12	11	24	0	0	50	34	17
EE	11	8	3	0	0	0	1	0	0	0	0	0	0	1
IE	31	25	6	0	0	1	1	1	0	0	0	1	2	1
EL	50	38	13	1	0	4	2	1	0	0	0	2	7	3
ES	306	250	56	1	0	8	16	9	9	0	0	10	38	12
FR	422	347	75	2	1	10	11	7	24	0	0	16	18	8
HR	35	27	7	0	0	1	2	0	0	0	0	2	2	1
IT	368	304	64	1	1	13	10	4	14	0	1	16	24	15
CY	10	8	2	0	0	0	0	0	0	0	0	0	0	0
LV	15	12	3	0	0	0	1	0	1	0	0	1	0	0
LT	21	15	6	0	0	0	1	0	0	0	0	1	1	2
LU	6	5	1	0	0	0	0	0	0	0	0	0	0	0
HU	40	27	13	0	0	1	7	1	7	0	0	6	2	1
MT	3	2	1	0	0	0	0	0	0	0	0	0	0	0
NL	81	65	16	1	0	4	2	1	5	0	0	15	3	4
AT	62	52	10	0	0	2	1	2	4	0	0	4	4	2
PL	303	260	43	3	0	3	19	6	10	0	0	27	20	6
PT	71	59	12	0	0	1	2	1	2	0	0	2	4	2
RO	94	69	25	2	0	1	13	2	3	0	0	8	18	10
SI	20	18	2	0	0	1	1	0	0	0	0	1	1	0

SK	33	25	8	0	0	1	3	0	2	0	0	3	3	1
FI	38	31	7	0	0	1	2	0	2	0	0	3	2	1
SE	47	36	12	1	0	1	3	2	3	0	0	4	2	2

Source: DG MOVE, European Passenger Mobility Survey, 2022

Table 27 -Passenger-kilometres (10^9pkm) performed by the entire reference population, per year, by travel purpose

MS	home	work (commuting)	professional/ business	education	shopping	escorting	leisure	personal business	other
EU	1324.9	545.7	186.0	73.5	484.8	156.6	211.6	436.4	145.3
BE	30.2	11.0	4.5	2.9	10.1	4.2	4.5	9.0	2.7
BG	18.8	8.2	6.6	1.0	6.8	1.3	1.8	6.5	1.8
CZ	32.7	13.5	5.0	1.1	15.1	5.1	7.2	13.2	3.0
DK	17.9	6.2	3.0	1.4	5.5	1.4	2.0	5.8	2.8
DE	217.6	92.5	29.7	16.3	73.4	27.7	34.3	58.6	24.6
EE	6.0	1.4	0.8	0.1	1.3	0.7	1.0	1.4	0.8
IE	15.4	4.5	2.7	0.8	5.6	2.0	2.2	4.1	1.0
EL	27.4	7.3	8.1	1.1	8.7	2.6	4.5	8.6	2.2
ES	149.1	66.1	22.4	7.7	49.1	18.7	26.8	57.3	12.3
FR	205.7	87.8	25.7	10.8	62.9	20.8	24.1	60.3	21.4
HR	14.7	5.4	2.3	0.6	7.3	1.6	3.0	6.1	1.3
IT	183.5	66.0	15.2	7.3	64.1	18.4	33.6	62.9	17.4
CY	4.1	1.1	1.4	0.2	0.6	0.5	0.8	1.1	0.3
LV	6.9	2.2	0.9	0.2	2.4	0.9	1.5	2.3	0.9
LT	12.1	2.5	1.9	0.1	3.4	1.7	1.3	2.9	1.0
LU	3.0	1.1	0.4	0.1	0.5	0.2	0.6	0.9	0.2
HU	25.2	11.0	3.4	0.9	11.5	3.0	2.1	6.1	2.4
MT	1.5	0.5	0.2	0.0	0.3	0.1	0.3	0.4	0.2
NL	46.1	14.8	10.2	3.7	10.9	5.0	6.2	14.7	5.8
AT	31.3	11.3	3.9	2.1	10.1	3.9	6.9	10.1	3.5
PL	125.8	70.3	19.2	6.0	69.5	18.0	22.7	48.3	17.7
PT	28.2	13.2	3.9	2.1	12.4	4.8	5.8	12.2	4.1
RO	53.0	22.6	5.0	3.3	28.3	5.8	6.2	19.5	8.5
SI	8.7	3.6	1.2	0.4	2.7	1.0	2.0	4.4	0.9
SK	16.4	8.1	2.8	1.0	5.4	2.1	3.3	5.8	1.8
FI	19.5	5.8	2.3	0.5	8.3	2.2	3.9	5.3	2.3
SE	24.3	7.4	3.3	1.5	8.4	2.7	2.9	8.4	4.4

Source: DG MOVE, European Passenger Mobility Survey, 2022

Table 28 - Passenger-kilometres (10^9pkm) performed by the entire reference population, per year, by fuel type

MS	petrol	diesel	petrol electric	diesel electric	electric vehicle (E.V)	LPG	NG	hydrogen	other/unknown
EU	713.1	646.0	38.9	4.7	170.4	50.5	6.8	0.6	1037.6
BE	17.9	17.9	0.9	0.1	3.5	0.1	0.3	0.0	19.1
BG	4.6	3.7	0.0	0.0	2.1	1.0	0.0	0.0	21.8
CZ	10.5	6.8	0.0	0.0	5.2	0.4	0.0	0.0	42.0
DK	11.7	6.0	0.8	0.0	3.7	0.0	0.0	0.0	8.2
DE	228.6	100.5	8.0	1.1	20.8	3.2	0.7	0.1	49.8
EE	2.4	1.8	0.1	0.0	0.3	0.1	0.0	0.0	6.0
IE	4.2	7.8	0.5	0.3	2.4	0.0	0.0	0.0	16.2
EL	8.0	2.4	0.0	0.0	4.5	0.6	0.0	0.0	34.7
ES	68.2	103.8	3.8	0.4	23.8	0.9	0.0	0.4	104.7
FR	84.9	125.3	4.9	0.7	22.9	0.6	0.3	0.0	182.5
HR	5.8	6.9	0.1	0.1	2.1	0.3	0.0	0.0	19.2
IT	82.0	103.0	10.8	1.3	17.1	30.1	4.8	0.1	118.5
CY	2.4	1.5	0.1	0.1	0.6	0.0	0.0	0.0	4.9
LV	1.8	2.4	0.0	0.0	0.1	0.3	0.0	0.0	10.5
LT	1.8	4.1	0.1	0.0	0.5	0.5	0.0	0.0	13.8
LU	0.9	1.5	0.1	0.0	0.4	0.0	0.0	0.0	3.3
HU	6.3	3.4	0.0	0.0	1.4	0.0	0.0	0.0	28.9
MT	1.2	0.5	0.0	0.0	0.1	0.0	0.0	0.0	1.0
NL	26.7	9.7	2.2	0.1	6.4	0.4	0.2	0.0	35.1
AT	21.4	30.4	0.7	0.1	1.7	0.1	0.0	0.0	7.5
PL	58.7	42.5	2.3	0.2	28.1	10.2	0.0	0.0	160.5
PT	11.5	20.0	0.8	0.1	3.0	0.6	0.0	0.0	35.3
RO	16.7	20.5	0.1	0.0	9.2	1.0	0.0	0.0	46.8
SI	2.6	3.7	0.0	0.0	2.3	0.0	0.0	0.0	11.7
SK	6.4	5.4	0.0	0.0	2.3	0.1	0.0	0.0	18.8
FI	8.4	3.7	0.7	0.1	3.4	0.0	0.0	0.0	21.8
SE	17.3	10.6	1.7	0.2	2.3	0.0	0.2	0.0	15.0

Source: DG MOVE, European Passenger Mobility Survey, 2022

URBAN MOBILITY

Table 29 - Passenger-kilometres (10^9pkm) performed by the entire reference population, per year, by main travel mode

MS	car (total)	car as driver	car as passenger	taxi as passenger	van/lorry/tractor /camper	motorcycle/moped	bus and coach	metro/tram/light rail	train (total)	aviation	waterways	cycling	walking	other/unknown
EU	963	819	144	5	1	26	57	33	45	0	0	82	114	28
BE	29	24	5	0	0	1	1	1	2	0	0	2	2	2
BG	15	11	4	0	0	0	3	1	0	0	0	1	3	1
CZ	18	14	4	0	0	0	2	2	2	0	0	2	4	1
DK	10	8	2	0	0	0	1	0	1	0	0	2	2	1
DE	197	173	24	1	1	4	7	7	12	0	0	27	21	5
EE	1	1	0	0	0	0	0	0	0	0	0	0	0	0
IE	7	6	1	0	0	0	0	0	0	0	0	1	1	0
EL	12	9	2	0	0	1	1	0	0	0	0	1	3	0
ES	116	100	16	0	0	3	9	4	2	0	0	4	25	3
FR	159	136	24	1	0	4	6	5	9	0	0	9	10	4
HR	10	8	2	0	0	0	1	0	0	0	0	1	1	0
IT	152	130	22	0	0	7	5	3	6	0	0	8	15	4
CY	3	2	0	0	0	0	0	0	0	0	0	0	0	0
LV	3	2	0	0	0	0	0	0	0	0	0	0	0	0
LT	3	2	1	0	0	0	0	0	0	0	0	0	1	0
LU	2	2	0	0	0	0	0	0	0	0	0	0	0	0
HU	17	12	5	0	0	0	3	1	2	0	0	2	1	0
MT	1	1	0	0	0	0	0	0	0	0	0	0	0	0
NL	22	19	3	0	0	1	1	0	1	0	0	6	1	1
AT	27	22	5	0	0	1	1	2	3	0	0	2	2	0
PL	99	86	13	1	0	1	8	3	4	0	0	10	9	2
PT	16	14	2	0	0	0	0	0	1	0	0	0	2	1
RO	19	15	4	0	0	0	3	1	0	0	0	1	6	1
SI	5	4	0	0	0	0	0	0	0	0	0	0	1	0
SK	3	2	1	0	0	0	1	0	0	0	0	1	1	0
FI	10	8	1	0	0	0	1	0	0	0	0	1	1	0
SE	8	7	2	0	0	0	1	1	1	0	0	1	1	0

Source: DG MOVE, European Passenger Mobility Survey, 2022

Table 30 - Passenger-kilometres (10^9pkm) performed by the entire reference population, per year, by travel purpose

MS	home	work (commuting)	professional/ business	education	shopping	escorting	leisure	personal business	other
EU	495.7	222.1	53.5	28.7	217.9	64.6	76.6	150.7	45.8
BE	15.3	5.7	2.4	1.4	5.9	2.7	1.9	3.9	1.6
BG	9.3	4.2	2.2	0.4	4.1	0.9	0.9	2.3	0.8
CZ	10.2	4.2	1.3	0.3	5.6	2.0	2.3	4.4	1.0
DK	6.3	2.3	1.2	0.3	2.3	0.7	1.0	2.0	0.8
DE	102.4	49.8	10.5	7.9	41.2	12.4	16.4	29.6	10.2
EE	0.7	0.3	0.0	0.0	0.2	0.1	0.1	0.1	0.1
IE	3.8	1.4	0.5	0.2	1.3	0.8	0.6	1.1	0.3
EL	7.1	2.1	1.7	0.2	2.9	0.7	0.8	1.8	0.5
ES	63.1	22.6	5.4	3.1	26.2	10.0	10.1	22.7	4.9
FR	78.0	41.8	8.2	6.0	28.4	9.8	10.6	20.8	5.4
HR	4.5	1.7	0.5	0.3	2.9	0.7	0.8	1.7	0.3
IT	75.9	33.6	5.3	2.5	34.1	7.7	11.7	23.2	6.2
CY	1.1	0.4	0.4	0.0	0.2	0.1	0.1	0.2	0.1
LV	1.5	0.6	0.1	0.1	0.6	0.3	0.2	0.4	0.1
LT	1.9	0.6	0.5	0.0	0.3	0.1	0.1	0.5	0.1
LU	0.9	0.6	0.1	0.0	0.1	0.1	0.1	0.2	0.1
HU	10.1	5.0	1.2	0.4	5.6	1.3	0.8	1.8	0.9
MT	0.6	0.3	0.1	0.0	0.0	0.0	0.1	0.1	0.0
NL	14.8	5.2	2.5	0.9	3.1	1.3	2.5	2.9	0.8
AT	12.9	5.5	1.9	0.7	6.0	1.6	2.9	4.6	1.9
PL	44.7	22.6	4.7	2.5	28.3	6.9	6.8	14.6	5.8
PT	6.4	2.6	0.4	0.5	4.5	1.5	1.0	2.6	1.1
RO	9.7	4.0	0.9	0.3	7.8	1.4	2.1	4.7	1.3
SI	1.9	0.9	0.4	0.1	0.8	0.2	0.7	0.9	0.4
SK	1.7	0.7	0.1	0.1	0.9	0.3	0.5	0.7	0.1
FI	5.2	1.9	0.5	0.2	2.8	0.5	0.9	1.4	0.4
SE	5.6	1.8	0.5	0.3	2.0	0.5	0.5	1.5	0.8

Source: DG MOVE, European Passenger Mobility Survey, 2022

Table 31 - Passenger-kilometres (10^9pkm) performed by the entire reference population, per year, by fuel type

MS	petrol	diesel	petrol electric	diesel electric	electric vehicle (E.V)	LPG	NG	hydrogen	other/unknown
EU	306.7	226.2	19.0	1.9	64.0	17.7	2.8	0.1	324.1
BE	9.3	9.0	0.5	0.0	1.5	0.0	0.0	0.0	8.7
BG	3.1	1.7	0.0	0.0	1.0	0.5	0.0	0.0	8.7
CZ	3.6	1.4	0.0	0.0	1.1	0.0	0.0	0.0	11.8
DK	4.4	1.7	0.3	0.0	1.0	0.0	0.0	0.0	2.8
DE	120.0	41.3	5.3	0.7	9.6	1.1	0.5	0.0	18.3
EE	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.5
IE	1.2	1.6	0.2	0.1	0.6	0.0	0.0	0.0	3.6
EL	1.9	0.3	0.0	0.0	0.8	0.2	0.0	0.0	8.5
ES	27.4	35.7	2.7	0.3	10.1	0.0	0.0	0.0	39.6
FR	37.2	46.2	1.8	0.2	11.6	0.5	0.0	0.0	62.0
HR	2.1	2.3	0.0	0.1	0.2	0.1	0.0	0.0	5.4
IT	37.6	41.7	4.7	0.4	9.0	11.4	2.0	0.0	45.1
CY	0.7	0.3	0.0	0.0	0.1	0.0	0.0	0.0	1.4
LV	0.3	0.7	0.0	0.0	0.0	0.0	0.0	0.0	1.7
LT	0.4	0.7	0.1	0.0	0.1	0.0	0.0	0.0	1.8
LU	0.3	0.5	0.1	0.0	0.1	0.0	0.0	0.0	1.0
HU	3.4	1.5	0.0	0.0	0.6	0.0	0.0	0.0	11.6
MT	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4
NL	7.6	2.7	0.9	0.0	1.7	0.0	0.1	0.0	8.7
AT	11.2	11.9	0.1	0.0	0.8	0.0	0.0	0.0	2.9
PL	21.2	13.1	1.4	0.0	8.5	3.4	0.0	0.0	51.5
PT	3.0	4.5	0.1	0.0	0.7	0.1	0.0	0.0	7.4
RO	4.5	3.4	0.1	0.0	2.0	0.1	0.0	0.0	9.0
SI	0.4	0.9	0.0	0.0	0.8	0.0	0.0	0.0	2.7
SK	0.5	0.4	0.0	0.0	0.3	0.0	0.0	0.0	1.6
FI	2.0	1.3	0.2	0.0	1.2	0.0	0.0	0.0	4.7
SE	2.8	1.3	0.6	0.0	0.7	0.0	0.0	0.0	2.9

Source: DG MOVE, European Passenger Mobility Survey, 2022

Annex IV: Comparison between National Travel Surveys in Europe and the NMP survey

IV.1 Introduction

Through the NTS review, several indicators on travel behaviour have been collected from 12 Member States with the purpose of making some comparisons between countries in terms of travel patterns, as well as of providing an initial quantitative reference for the results of the NMP survey. However, a meaningful comparison was difficult to achieve, not only across the different NTS, but also between the NTS and the NMP surveys. In fact, the variety of methods adopted (with most of the countries using their own national methodologies and did not follow the Eurostat guidelines), differences in definitions and concepts used (e.g., what is considered as a trip) and inhomogeneity in the type and format of data collected, hindered the possibility of realizing a significant and reliable comparison between the results of the NTS and NMP surveys.

This became evident from the results. Looking at the indicators extracted from the NTS and the NMP surveys, some striking results justified the impossibility of such comparison. For example, in almost all the Member States considered, the average number of trips and travel distance is higher in the NTS compared to the NMP survey. On the other hand, the average travel duration is higher in the NMP survey compared to the NTS. In particular, in two Member States the travel duration from the NMP survey is 60 minutes higher compared to the corresponding NTS for those countries.

Such inconsistencies due to differences in the methodologies used between the NTS and the NMP survey thus make it impossible to draw comparisons between the results. The only viable solution to be able to make a comparison would be to conduct a comprehensive post-harmonisation of the NTS (similar to what had been done in the SHANTI project). However, this is not foreseen within this study.

With this extremely important premise to be taken into consideration, the following sections showcase the results of a few indicators extracted from the NTS and the NMP surveys. This evidence further shows why this exercise has very little significance and cannot bring useful insights to the analysis, as mentioned above due methodological differences across surveys. It would be misleading if such differences were interpreted as trends, or effects, from the COVID-19 pandemic, when they are, in fact, simply the results of non-comparable methodologies.

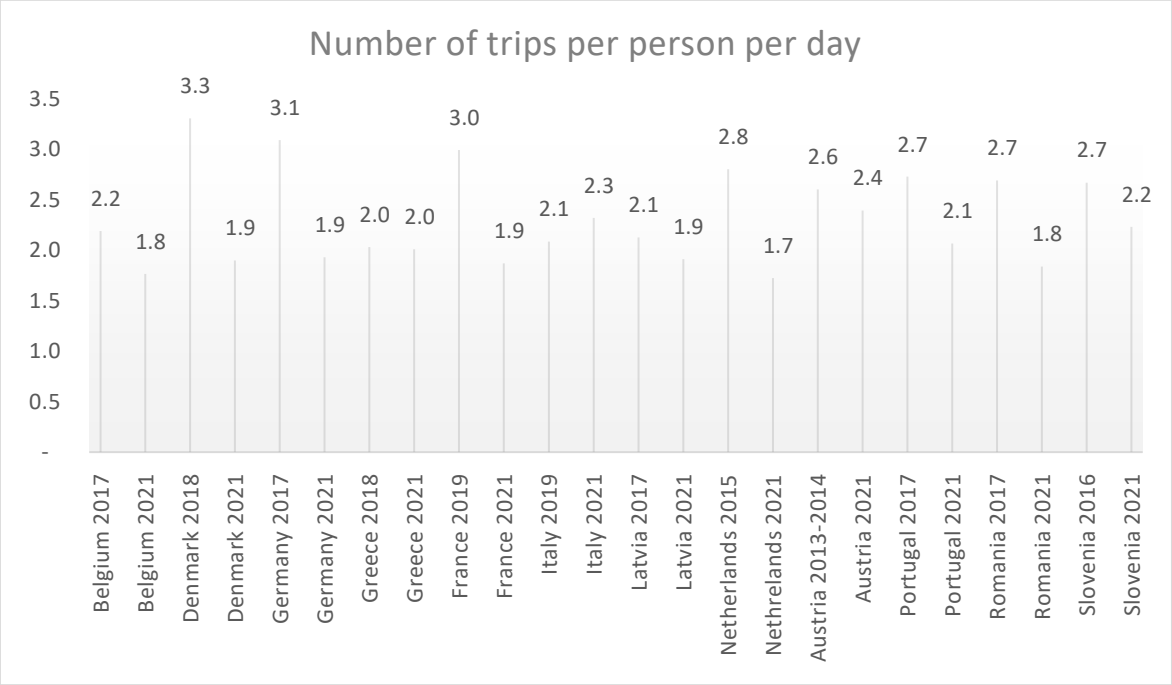
IV.2 Comparison between 12 Member States

This section shows the comparison between a selection of 12 Member States for which the NTS and NMP survey data was available. The comparison considered short-distance mobility trips, i.e. all trips with distances less than 300 km. Data from NTS ranges between 2013 and 2019, with the majority of them being realised in 2017 or after.

NUMBER OF TRIPS PER PERSON PER DAY

Figure 84 shows that the average number of short-distance daily trips per person changes negatively from the NTS to the NMP survey for all Member States except Italy, where a positive change of 0.2 trips per person per day is observed.

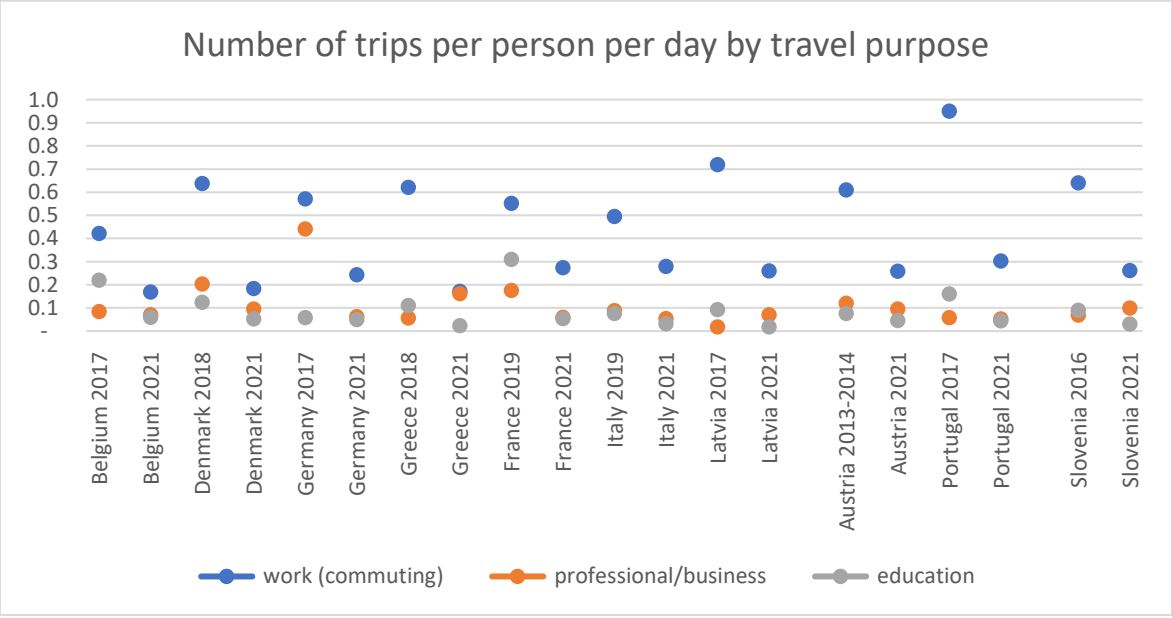
Figure 84 - Comparison in terms of number of short-distance trips between National travel Surveys and the New Mobility pattern survey



Source: DG MOVE, European Passenger Mobility Survey, 2022

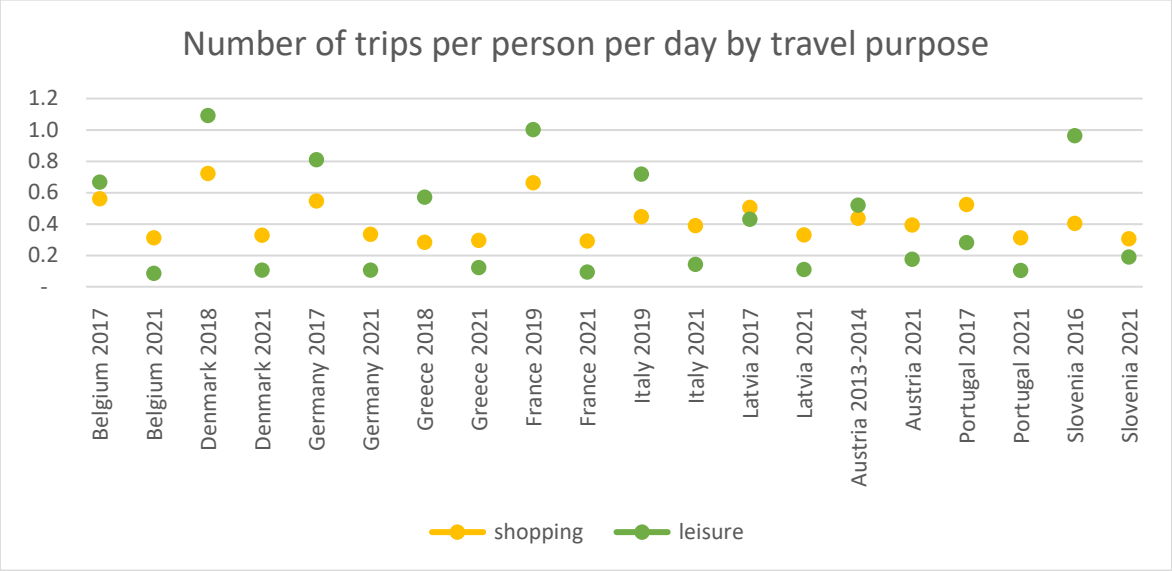
By linking this structure to the reason for the trip, it is observed that in all the Member States, the number of trips significantly changes negatively from the NTS to 2021. Also, leisure and commuting have the greatest difference in the number of trips. Two Member States recorded a slight positive change in the number of trips from the NTS to the NMP for shopping (Italy: 0.2 more trips and Austria: 0.1 more trips) (Figure 85 and Figure 86).

Figure 85 - Comparison of number of trips by professional travel purposes



Source: DG MOVE, European Passenger Mobility Survey, 2022

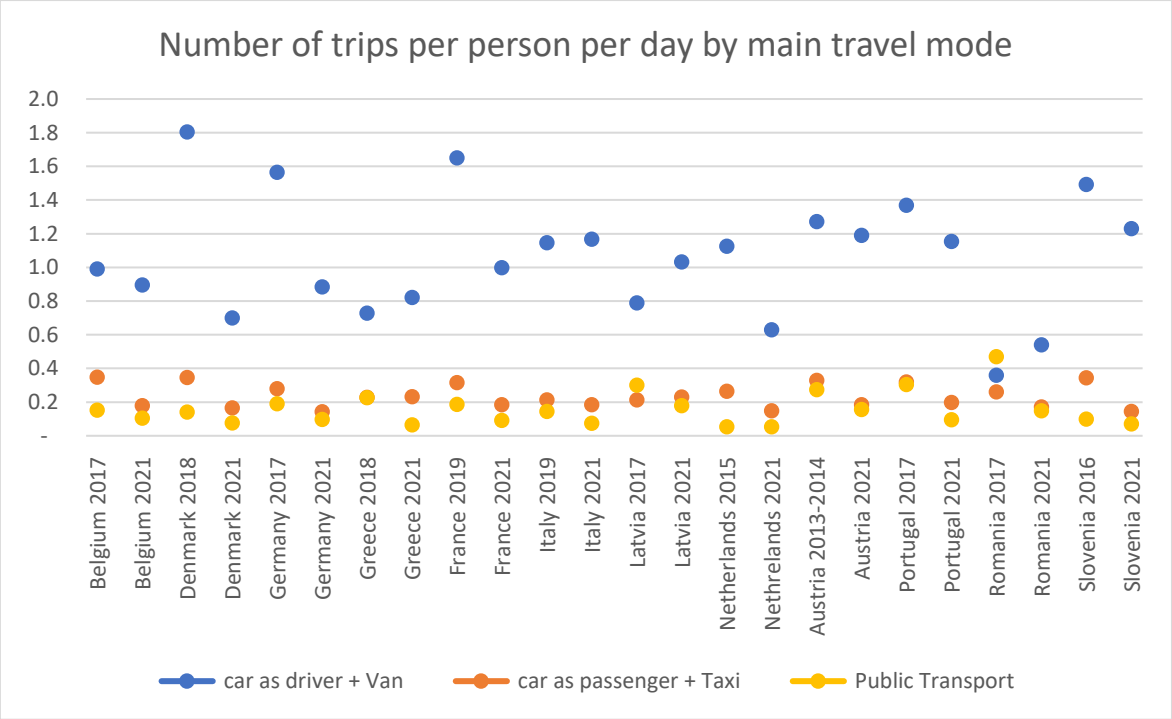
Figure 86 - Comparison of number of trips by recreational travel purposes



Source: DG MOVE, European Passenger Mobility Survey, 2022

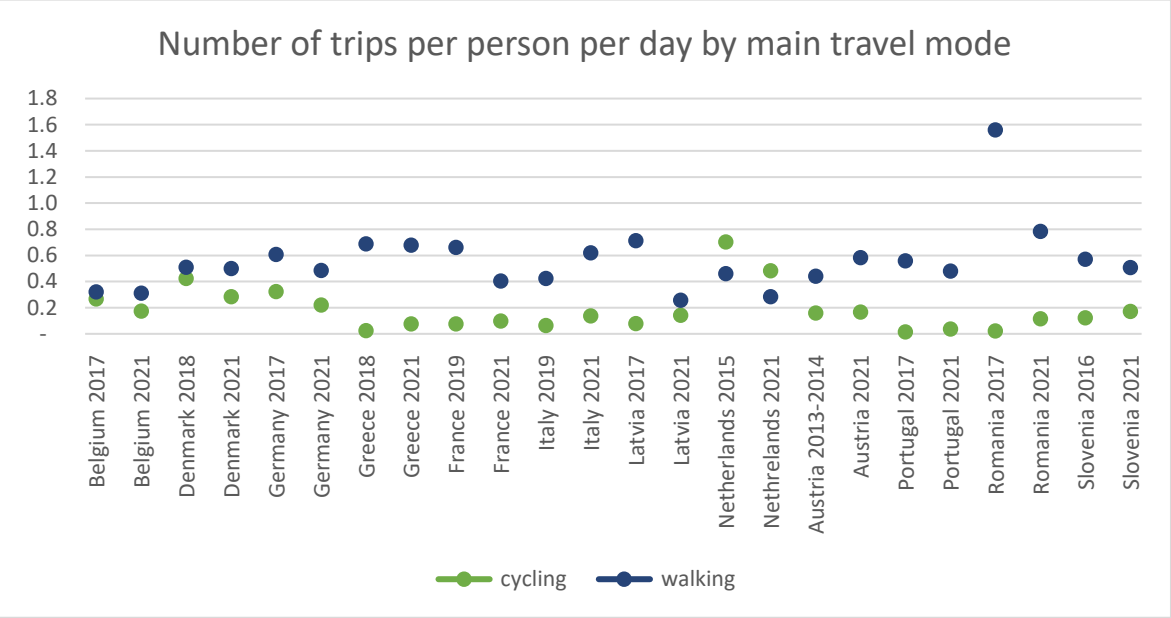
The structure of short-distance public transport trips is very similar across the Member States (Figure 87). Looking at Figure 88, we see that the transport mode which experienced the most changes is 'car as driver', particularly in Denmark (1 trip less from 2018 to 2021). In Romania, the most impacted mode is 'walking' and a slight positive change in the number of trips for the 'car as driver' mode has been observed.

Figure 87 - Comparison of number of trips by car and public transport



Source: DG MOVE, European Passenger Mobility Survey, 2022

Figure 88 - Comparison of number of trips by cycling and walking

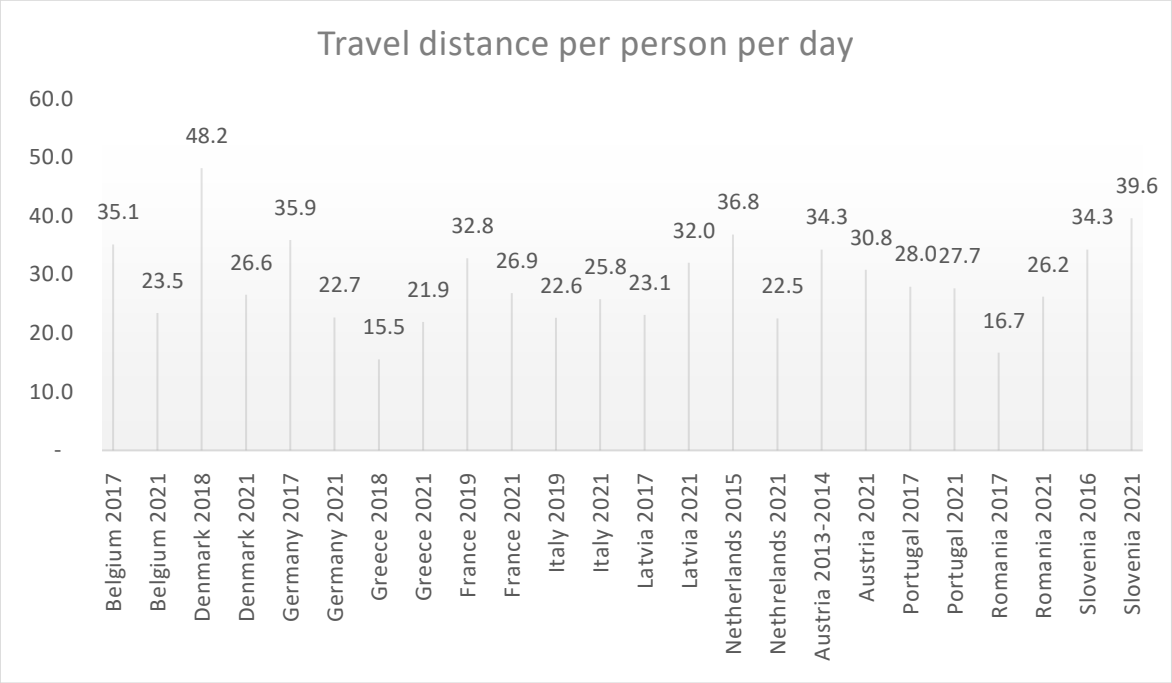


Source: DG MOVE, European Passenger Mobility Survey, 2022

TRAVEL DISTANCE PER PERSON PER DAY

The distance travelled per person experienced negative changes across the 12 Member States (Figure 89). A significant change in the distance travelled was observed between NTS and our 2021 survey in Belgium, Denmark, Germany, France and the Netherlands. However, in Latvia and Romania, the distance travelled changed positively by almost 10 km from 2017 to 2021. The distribution of the distance travelled daily by trip purpose reveals that the distance travelled for trips to work (home-to-work trips) and leisure declined the most. The distance travelled by 'car as driver' is higher in 2021 than in the NTS in half of the 12 Member States: Greece, Italy, Latvia, Portugal, Romania and Slovenia. A strong decline in the distance travelled (22 km) is observed for Denmark from 2018 to 2021. Compared to the other Member States, Romania has seen the greatest positive change in the distance travelled from 2017 to 2021 for the mode 'walking'.

Figure 89 - Comparison in term daily travel distance for short-distance trips between National travel Surveys and the New Mobility pattern survey



Source: DG MOVE, European Passenger Mobility Survey, 2022

TRAVEL DURATION PER PERSON PER DAY

The daily travel time of short-distance trips experienced significant positive changes across all Member States, except in Germany, France, Latvia and the Netherlands, despite the fact that distances travelled changed negatively in most Member States when comparing the results from the NTS and the NMP surveys. The highest difference in travel time between the NTS and the NMP survey is observed in Romania (64.7 min). In almost all Member States, the reasons for travel which registered a positive change from NTS to 2021 are personal business and shopping. In almost all Member States, the reason for travel with a significant drop in travel time since the last NTS is leisure, except in Greece and Portugal. All travel durations for almost all main travel modes have changed positively, with the exception of public transport.

IV.3 Conclusion

As mentioned above, any comparisons that can be made between the NTS and NMP surveys are at present, very poor. Extensive post-harmonisation of the NTS data would be required to make comparisons meaningful. Conducting the NMP survey has shown that the methodologies used when conducting mobility surveys in EU Member States are very different, with limited countries willing to keep their well-established tradition of regular NTS implementation (e.g. Denmark. Germany and the Netherlands) and others where data is collected very irregularly. Recreating this same survey, with identical methods and definitions, in a few years will offer a realistic chance to understand how mobility patterns are evolving across EU Member States. Unfortunately, as of now, this is not possible when comparing the latest NTS and the NMP survey results.

Annex V : Questionnaire

Task A Questionnaire
Version of 04/03/2021

INTRODUCTION TEXT ONLINE:
Welcome to our international study on new mobility patterns in Europe. This study is conducted on behalf of the European Commission.

The aim of this study is to provide the European Commission with an extensive dataset covering mobility patterns of residents in all 27 EU Member States.
The target population for this survey are EU residents between 15 and 84 years old.

The survey will take approximately 15 minutes.

Your answers to this voluntary survey will be treated in strict confidence, used for statistical or policy research purposes and published in aggregate form only.

https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02016R0679-20160504

INTRODUCTION TEXT PHONE:
Good (daypart), I am (interviewer name), and I am calling from GDCC (Global Data Collection Company).
We are conducting an international study on new mobility patterns in Europe. We are conducting this study on behalf of the European Commission.

The aim of this study is to provide the European Commission with an extensive dataset covering mobility patterns of residents in all 27 EU Member States.
We would like to speak with a person from your household between 15 and 84 years old to participate in this survey.

The interview will take approximately 15 minutes.

[READ IF NECESSARY:
Your household was selected randomly to participate in this survey.
Your answers to this voluntary survey will be treated in strict confidence, used for statistical or policy research purposes and published in aggregate form only.]

Do you have children younger than 18 years old?

- Yes
- No

If Yes:

How old is your child/ are your children?

- 0-4 years old
- 5-10 years old
- 11-14 years old

- 15-17 years old
- I would rather not say or refuse to answer

If 15-17 years old <> 0 then selection of the respondent.
If age of the respondent is < 18, ask parental consent:

We are conducting a survey about EU residents between 15 and 84 years old on behalf of the European Commission. Would your child between 15 – 17 years old be available to participate in this survey at this moment?
If you have more children between 15-17 years old please check who is available for this survey as only 1 child can participate.

- Yes, my child is available to participate and I give permission to let him / her participate
- No, my child is not available at this moment
- No, I don't give permission to let my child participate

Information about the respondent

Q00A: What is your gender?

1. Male
2. Female

Q00B: What is your age?

- Number [15 - 84]

Q00C: Where do you live (Please give the zip code only)?
ZIPCODE

Q01. What is your occupational status?

1. Employee
2. Self-employed
3. Unemployed
4. Homemaker
5. Student
6. Trainee
7. Retired
8. Other
9. I would rather not say or refuse to answer

If employee or self-employed or student (ask Q02)
Q02. Is this occupation?

1. Full time
2. Part time

If student/trainee (ask Q03)
Q03. Where do you study? / Where do you have your internship? Please give the zip code.
ZIP code

(First 3 digits of Eirecode for Irland)

If working (part-time or full-time) (ask Q04)

Q04. Where is your primary place of occupation? Please give the zip code.

ZIP code

(First 3 digits of Eirecode for Irland)

Q05. What is your highest education level?

0. Early childhood Education
1. Primary education
2. Lower secondary education
3. Upper secondary education
4. Post-secondary non-tertiary education
5. Short-cycle tertiary education
6. Bachelor or equivalent
7. Master or equivalent
8. Doctoral or equivalent
9. I don't know or refuse to answer

Level	ISCED 2011	Description
0	Early childhood Education (01 Early childhood educational development). Early childhood Education (02 Pre-primary education)	Education designed to support early development in preparation for participation in school and society. Programmes designed for children below the age of 3. Education designed to support early development in preparation for participation in school and society. Programmes designed for children from age 3 to the start of primary education.
1	Primary education	Programmes typically designed to provide students with fundamental skills in reading, writing and mathematics and to establish a solid foundation for learning.
2	Lower secondary education	First stage of secondary education building on primary education, typically with a more subject-oriented curriculum.
3	Upper secondary education	Second/final stage of secondary education preparing for tertiary education and/or providing skills relevant to employment. Usually with an increased range of subject options and streams.
4	Post-secondary non-tertiary education	Programmes providing learning experiences that build on secondary education and prepare for labour market entry and/or tertiary education. The content is broader than secondary but not as complex as tertiary education.
5	Short-cycle tertiary education	Short first tertiary programmes that are typically practically-based, occupationally-specific and prepare for labour market entry. These programmes may also provide a pathway to other tertiary programmes.
6	Bachelor or equivalent	Programmes designed to provide intermediate academic and/or professional knowledge, skills and competencies leading to a first tertiary degree or equivalent qualification.
7	Master or equivalent	Programmes designed to provide advanced academic and/or professional knowledge, skills and competencies leading to a second tertiary degree or equivalent qualification.
8	Doctoral or equivalent	Programmes designed primarily to lead to an advanced research qualification, usually concluding with the submission and defense of a substantive dissertation of publishable quality based on original research.

Q06. Do you hold a car driving licence (B licence)?

B licence: for motor vehicles with a maximum authorised mass not exceeding 3,500 kilograms, and designed and constructed for the carriage of no more than eight passengers in addition to the driver.

1. Yes
2. No
3. I would rather not say or refuse to answer

Household description

Q07. How many persons live in your household (including yourself**)?**

Household = People living in the same housing at least three nights a week excluding weekends, without these people necessarily being linked by family ties (for example: in the case of cohabitation)

n=Number

If How many persons live in your household? > 1

Q08. Among those persons in your household, how many are 14 years old and over (including yourself)?

n=Number

If How many persons live in your household? > 1

Q09. What is your household type?

1. ~~Single (Q7 > 1)~~
2. Couple without children
3. Couple with children
4. Single parent family
5. Other (cohabitation, …)
6. I would rather not say or refuse to answer

If How many persons live in your household? = 1

Q10. Are you physically impaired (in such a way that hinders you in making trips)?

1. Yes
2. No
3. I would rather not say or refuse to answer

If How many persons live in your household? > 1

Q11. Is there a member of your household physically impaired (in such a way that hinders you\them in making trips)?

1. Yes (not yourself)
2. Yes, only myself
3. Yes, myself and other member(s)
4. None
5. I would rather not say or refuse to answer

Vehicle availability in the household

Q12. How many cars (owned, leased or company car) are available for daily use in your household?

Number

Q13. How many motorcycles / mopeds (owned or leased) are available for daily use in your household?

Number

Q14. How many adult bikes (including electric bike) are available for daily use in your household?

Number

Q15. How many other electric personal transportation devices are available for daily use in your household, excluding electric cars, motorcycles / mopeds and bikes? (Such as electric scooter, electric skateboard, electric unicycle, hoverboard, onewheel, segway, gyropod but not electric bike, neither electric car)

Number

Date of filling this questionnaire is DD/MM/YYYY.
The day of description of your mobility is: DD-1/MM/YYYY (Yesterday, from 04h00 until 03h59 today).

Q16. Did you stay at home all day long?

	On day D-1?	On day D-2?	On day D-3?	On day D-4?	On day D-5?	On day D-6?	On day D-7?
	01	02	03	04	05	06	07
1. Yes **2.** No	**Q1601**	**Q1602**	**Q1603**	**Q1604**	**Q1605**	**Q1606**	**Q1607**

if 1 < household size :

Q16B : Excluding yourself, how many people from your household stayed at home all day long?

On day D-1?	On day D-2?
01	02
Q16B01 **Number + I do not know**	**Q16B02** **Number + I do not know**

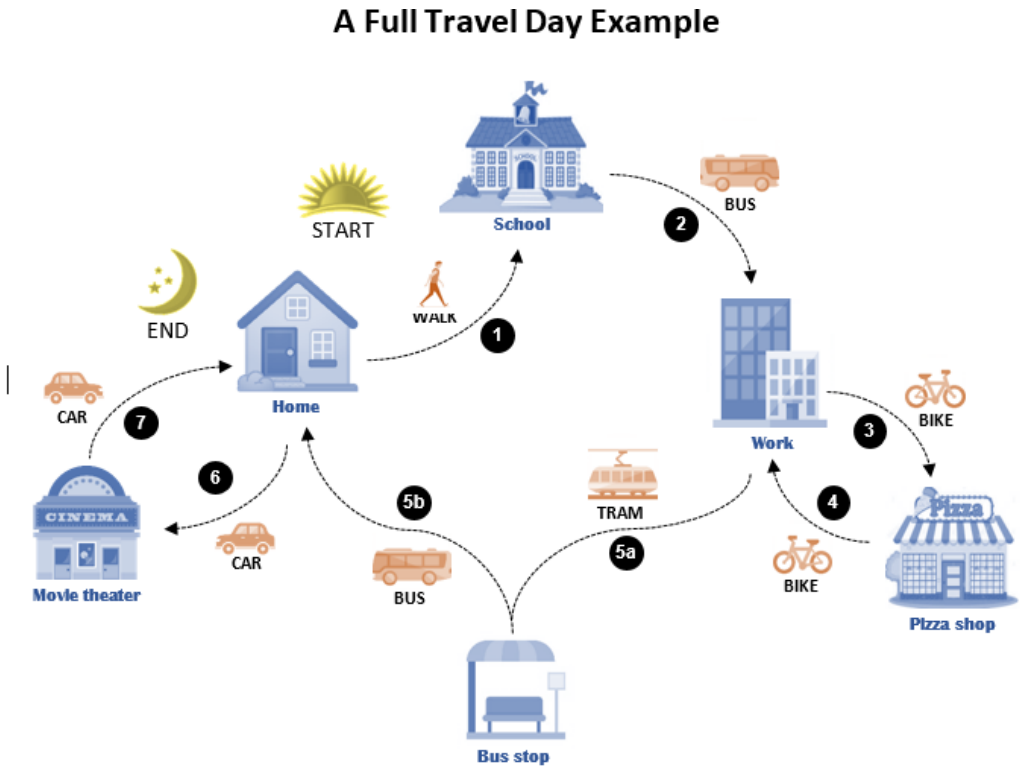
If employee or self-employed or student or trainee (ask Q1701 to Q1707)

Q17. Did you travel for work / for school?

	On day D-1?	On day D-2?	On day D-3?	On day D-4?	On day D-5?	On day D-6?	On day D-7?
	01	02	03	04	05	06	07
1. Yes **2.** No	**Q1701**	**Q1702**	**Q1703**	**Q1704**	**Q1705**	**Q1706**	**Q1707**

InfoQ16 Description of mobility

In this section, we will ask you to describe your mobility for a single day during the week.
We will ask you to describe your mobility for <insert yesterday's date> between 04h00 until 03h59. this morning



Q16_1
How many trips did you perform yesterday <insert yesterday's date> **from 04:00 in the morning until 03:59 this morning?**

A trip is defined as the travel to do a main activity at the destination. An activity is the main business carried out in one location. For instance, working, visiting friends, shopping, etc.

A new purpose involves a new trip. For instance:
- *Going from home to work is a trip and going from work to home is another trip. A trip is composed of one or more stages.*
- *Drop off a child to school on your way to work are two trips. First from home to school and second from school to work.*
- *Stopping on the way back home for doing an activity (e.g. shopping) should be described as two trips. First the trip from work to the shop and the second trip from the shop to home).*

Number of trips: …. <minimum is 0>
If number of trips is "0". Then ask question: "**You mentioned that you had 0 trips yesterday. Can you confirm that you did <u>not</u> leave your home yesterday for shopping, personal business, to drop / pick up someone, etc.?**" -
- Yes [programmer: skip trip diary]
- No, [programmer: go back to question "How many trips did you perform yesterday?"]

Mobility activities that are undertaken by one person from 15 to 84
For all trips made on day DD-1/MM/YYYY **(starting at 04h00 on** DD-1/MM/YYYY **until 03h59** next day**) - Maximum description is 15 trips**

T00. For the FIRST trip of this day DD-1, were you departing from your home?

1. Yes
2. No

Description of trip n°01:
If "for the FIRST trip of this day, are you departing from your home?" =NO (Ask T0102)

T0102: Where did you leave from?
ZIP code (First 3 digits of Eirecode for Irland)
I don't know or refuse to answer
If you do not know please write the name of the municipality

T0103: At what time did you leave (from 00:00 to 23:59)?
_ _HH_ _MM

T0103B: Did the time of departure correspond to the next day DD?
1. Yes
2. No

T0104: Where did you go?
ZIP code (First 3 digits of Eirecode for Irland)
I don't know or refuse to answer
If you do not know please write the name of the municipality

T0105: For what reason did you travel?
See list of purposes

T0106: At what time did you arrive at your destination (from 00:00 to 23:59) (related to response "Where did you go?")**?**
_ _HH_ _MM

T0106B: Did the time of arrival correspond to the next day DD?
1. Yes
2. No

T0107: What was the overall distance of the trip?
_ _ _ km _ 00 m

T0108: What was the total number of persons who were travelling with you from the origin to the destination during this trip (including yourself)?
Number

Show a pop up windows with the definition of stage.

Description of all travel mode used for trip n°1
Stage 01: First travel mode:

S010101: What was your first travel mode for trip n°1?
See list of travel modes

S010102: Could you describe your travel mode?
If mode = Urban public transport (city bus, trolleybus, tramway, cable car, funicular railway, metro, suburb train)
What type of public transport was it?
1.1. A bus or trolleybus
1.2. A tramway
1.3. A cable car or a funicular railway
1.4. A metro
1.5. A suburb train

If mode = Bicycle
What type of bicycle was it?
2.1. Privately owned electric bike

2.2. Privately owned bike (not electric)
2.3. Electric bike sharing / bike rental
2.4. Bike sharing/ bike rental (not electric)

If mode = Motorcycle / Moped
What type of motorcycle / moped was it?
3.1. Privately owned or on lease electric motorcycle/moped
3.2. Privately owned or on lease motorcycle/moped (not electric)
3.3. Electric motorcycle or Moped sharing
3.4. Motorcycle or Moped sharing (not electric)
3.5. Rental Motorcycle / moped
3.6. Ride Hailing

If mode = Car
What type of car was it?
4.1 Privately owned or on lease or company car
4.2 Electric car sharing
4.3 Car sharing (not electric)
4.4 Rental car
4.5 Ride Hailing

S010103: How long did it take (in minutes)?
__MM

If mode= Car , moped or public transport
S010105: How much of this time was spent in congested traffic* ?
((time (in minutes) that you've spent in traffic, not moving or moving at a considerably lower speed than the limits))
__MM

S010104: How far did you travel?
_ _ _ km _ 00 m

Second travel mode:
S010201: What was your second travel mode for the trip n°1?
See list of travel modes
S010202: Could you describe your travel mode?

If mode = Urban public transport (City bus, trolleybus, Tramway, Cable car, funicular railway, Metro, Suburb train)
What type of public transport was it?
1.1. A bus or trolleybus
1.2. A tramway
1.3. A cable car or a funicular railway
1.4. A metro
1.5. A suburb train

If mode = Bicycle
What type of bicycle was it?
2.1 Privately owned electric bike
2.2 Privately owned bike (not electric)
2.3 Electric bike sharing / bike rental
2.4 Bike sharing / bike rental (not electric)

If mode = Motorcycle / moped
What type of motorcycle / moped was it?
3.1 Privately owned or on lease electric motorcycle/moped
3.2 Privately owned or on lease motorcycle/moped (not electric)
3.3 Electric motorcycle or Moped sharing
3.4 Motorcycle or Moped sharing (not electric)
3.5 Rental Motorcycle / moped
3.6 Ride Hailing

If mode = car
What type of car was it?
4.1 Privately owned or on lease or company car
4.2 Electric car sharing
4.3 Car sharing (not electric)

4.4 Rental car
4.5 Ride Hailing

S010203: How did long did it takes (in minutes)?
__MM

If mode= Car , moped or public transport
S010205: How much of this time was spent in congested traffic* ?
((time (in minutes) that you've spent in traffic, not moving or moving at a considerably lower speed than the limits**)**
__MM

S010204: How far did you travel?
_ _ _ km _ 00 m
Distance (mi or lm) but with one decimal

10th travel mode:
S011001: What was your tenth travel mode for the trip n°1?
See list of travel modes
S011002: Could you describe your travel mode?
If mode = Urban public transport (City bus, trolleybus, Tramway, Cable car, funicular railway, Metro, Suburb train)
What type of public transport was it?
1.1 A bus or trolleybus
1.2 A tramway
1.3 A cable car or a funicular railway
1.4 A metro
1.5 A suburb train

If mode = Bicycle
What type of bicycle was it?
2.1 Privately owned electric bike
2.2 Privately owned bike (not electric)
2.3 Electric bike sharing / bike rental
2.4 Bike sharing / bike rental (not electric)

If mode = Motorcycle / Moped
What type of motorcycle / moped was it?
3.1 Privately owned or on lease electric motorcycle/moped
3.2 Privately owned or on lease motorcycle/moped (not electric)
3.3 Electric motorcycle or Moped sharing
3.4 Motorcycle or Moped sharing (not electric)
3.5 Rental Motorcycle / moped
3.6 Ride Hailing

If mode = Car
What type of car was it?
4.1 Privately owned or on lease or company car
4.2 Electric car sharing
4.3 Car sharing (not electric)
4.4 Rental car
4.5 Ride Hailing

S011003: How did long did it takes (in minutes)?
__MM

If mode= Car , moped or public transport
S011005: How much of this time was spent in congested traffic* ?
(time (in minutes) that you've spent in traffic, not moving or moving at a considerably lower speed than the limits**)**
__MM

S011004: How far did you travel?
_ _ _ km _ 00 m

If mode = (motorcycle or car) and Ride sharing/car pooling

If (S010101 or S010201 or … or S011001) = (6 or 7 or 8 or 9) and If (S010102 or S010202 or … or S011002) = (3.3 or 3.4 or 4.2 or 4.3)

T0109: How did you connect to the driver for this ride?

1. By internet or a smartphone application
2. At work (colleagues)
3. By personal relationship (family, friends)
4. By hitchhiking
5. Other

If more than one stage

T0110: How long did you walk to change mode or vehicle (all changes together)?

__MM

…

Description of trip n°15:

T1503: At what time did you leave (from 00:00 to 23:59)?

_ _HH_ _MM

T1503B: Did the time of departure correspond to the next day DD?

1. Yes
2. No

T1504: Where did you go?

ZIP code

I don't know or refuse to answer

If you do not know please write in plain text the name of the municipality

T1505: For what reason did you travel?

See list of purpose

T1506: At what time did you arrive at your destination (from 00:00 to 23:59) (put response "Where did you go?

_ _HH_ _MM

T1506B: Did the time of arrival correspond to the next day DD?

1. Yes
2. No

T1507: What was the overall distance of the trip?

_ _ _ km _ 00 m

T1508: What was the total number of persons who were travelling with you from the origin to the destination during this trip (including the respondent)?

Number

Description of all travel mode used for trip n°15

First travel mode:

S150101: What was your first travel mode for the trip n°15?

See lit of travel mode

S150102: Could you describe your travel mode?

If mode = Urban public transport (City bus, trolleybus, Tramway, Cable car, funicular railway, Metro, Suburb train)

What type of public transport was it?

1.1. A bus or trolleybus
1.2. A tramway
1.3. A cable car or a funicular railway
1.4. A metro
1.5. A suburb train

If mode = Bicycle

What type of bicycle was it?

2.1 Privately owned electric bike
2.2 Privately owned bike (not electric)
2.3 Electric bike sharing / bike rental
2.4 Bike sharing / bike rental (not electric)

If mode = Motorcycle / moped

What type of motorcycle / moped was it?

3.1 Privately owned or on lease electric motorcycle/moped
3.2 Privately owned or on lease motorcycle/moped (not electric)
3.3 Electric motorcycle or Moped sharing
3.4 Motorcycle or Moped sharing (not electric)

3.5 Rental Motorcycle / moped
3.6 Ride Hailing

If mode = Car
What type of car was it?
4.1 Privately owned or on lease or company car
4.2 Electric car sharing
4.3 Car sharing (not electric)
4.4 Rental car
4.5 Ride Hailing

S150103: How did long did it takes (in minutes)?
__MM

If mode= Car , moped or public transport
S150105: How much of this time was spent in congested traffic* ?
((time (in minutes) that you've spent in traffic, not moving or moving at a considerably lower speed than the limits**)**
__MM

S150104: How far did you travel?
_ _ _ km _ 00 m

Second travel mode:
S150201: What was your second travel mode for the trip n°15?
See lit of travel mode
S150202: Could you describe your travel mode?
If mode = Urban public transport (City bus, trolleybus, Tramway, Cable car, funicular railway, Metro, Suburb train)
What type of public transport was it?
1.1. A bus or trolleybus
1.2. A tramway
1.3. A cable car or a funicular railway
1.4. A metro
1.5. A suburb train

If mode = Bicycle
What type of bicycle was it?
2.1 Privately owned electric bike
2.2 Privately owned bike (not electric)
2.3 Electric bike sharing / bike rental
2.4 Bike sharing / bike rental (not electric)

If mode = Motorcycle / moped
What type of motorcycle / moped was it?
3.1 Privately owned or on lease electric motorcycle/moped
3.2 Privately owned or on lease motorcycle/moped (not electric)
3.3 Electric motorcycle or Moped sharing
3.4 Motorcycle or Moped sharing (not electric)
3.5 Rental Motorcycle / moped
3.6 Ride Hailing

If mode = Car
What type of car was it?
4.1 Privately owned or on lease or company car
4.2 Electric car sharing
4.3 Car sharing (not electric)
4.4 Rental car
4.5 Ride Hailing

S150203: How did long did it takes (in minutes)?
__MM

If mode= Car , moped or public transport
S150205: How much of this time was spent in congested traffic* ?
((time (in minutes) that you've spent in traffic, not moving or moving at a considerably lower speed than the limits**)**
__MM

S150204: How far did you travel?
___ km _ 00 m

10th travel mode:

S151001: What was your 10th travel mode for the trip n°15?
See lit of travel mode

S151002: Could you describe your travel mode?

If mode = Urban public transport (City bus, trolleybus, Tramway, Cable car, funicular railway, Metro, Suburb train)

What type of public transport was it?

1.1 A bus or trolleybus
1.2 A tramway
1.3 A cable car or a funicular railway
1.4 A metro
1.5 A suburb train

If mode = Bicycle

What type of bicycle was it?

2.1 Privately owned electric bike
2.2 Privately owned bike (not electric)
2.3 Electric bike sharing / bike rental
2.4 Bike sharing / bike rental (not electric)

If mode = Motorcycle / moped

What type of motorcycle / moped was it?

3.1 Privately owned or on lease electric motorcycle/moped
3.2 Privately owned or on lease motorcycle/moped (not electric)
3.3 Electric motorcycle or Moped sharing
3.4 Motorcycle or Moped sharing (not electric)
3.5 Rental Motorcycle / moped
3.6 Ride Hailing

If mode = Car (as driver or as passenger)

What type of car was it?

4.1 Privately owned or on lease or company car
4.2 Electric car sharing
4.3 Car sharing (not electric)
4.4 Rental car
4.5 Ride Hailing

S151003: How did long did it takes (in minutes)?
__MM

If mode= Car , moped or public transport

S151005: How much of this time was spent in congested traffic* ?
((time (in minutes) that you've spent in traffic, not moving or moving at a considerably lower speed than the limits**)**
__MM

S151004: How far did you travel?
___ km _ 00 m

If (S010101 or S010201 or … or S011001) = (6 or 7 or 8 or 9) and If (S010102 or S010202 or … or S011002) = (3.3 or 3.4 or 4.2 or 4.3)

T1509: How did you connect to the driver for this ride?

1. By internet or a smartphone application
2. At work (colleagues)
3. By personal relationship (family, friends)
4. By hitchhiking
5. Other

If more than one stage

T1510: How long did you walk to change mode or vehicle (all changes together)?
__MM

List of trip purposes

11	Home
12	Second home, occasional housing, hotel, other residence
21	Usual place of work
22	Work related (meeting, etc.)
23	Attend school as a student
31	Purchases groceries,
32	Purchases other than groceries
41	Care, health
42	General errands (post office, formalities, seeking for employment, etc.)
43	Leisure, sports, cultural, library, associative activities
44	Restaurant / meal (go out for a meal, snack, take-away)
51	Visiting friends or relative
61	Drop off /pick up someone: kindergarten, creche, school, childcare
62	Drop off /pick up someone: train station or airport
63	Other Drop off /pick up
71	Other

List of travel modes

1. Walking only
2. Skate, rollerblade, scooter
3. Electric personal transportation device (Onewheel, Hoverboard / Caster board, Electric unicycle, Electric scooter, Electric skates, Electric skateboard)
4. Wheelchair (including motorised)
5. Bicycle
6. Motorcycle or Moped as driver
7. Motorcycle or Moped as passenger
8. Car, light commercial vehicle as driver
9. Car, light commercial vehicle as passenger
10. Other car, golf, ... cart as driver
11. Other car, golf cart as passenger
12. Passenger in a ride hailing (taxi, Uber, Lyft, ...)
13. Passenger in specialised transportation (handicapped, school bus)
14. Van / Lorry / Tractor etc.
15. Urban public transport (city bus, trolleybus, tramway, cable car, funicular railway, metro, suburb train)
16. High-speed train
17. Other train
18. Coach
19. Airplane
20. Boat
21. Other

In pop up windows: SXXYY02 Q19 Q20, Q21, Q22, Q23 and Q24

Definitions.

- Ride sharing/Car pooling: An arrangement through websites or mobile apps, in which a passenger travels in a private vehicle driven by its owner, heading in the same direction for a fee or for free. E.g. Blablacar, Klaxit, Carpooling, iDVROOM, Europe-carpooling, Mobicoop, Kowo, etc.

- Car sharing: A form of car-rental service, which offers to its members the possibility to book a car by the hour or day. The online booking (through websites or mobile apps) is available 24 hours a day, 7 days per week. Reservation, pickup and return are done on a self-service basis. Usually the vehicle locations are geographically distributed and unattended. E.g. Zipcar, Car2Go / Share Now, Cambio, Getaround, CarAmigo, Emov, Pony, etc.

- Ride hailing: A service which, similar to taxi service, allows the passenger to ask for a car and driver to come immediately and take you somewhere. E.g. Taxi, Uber, Lyft, etc.

- Motorcycle / moped sharing: A form of motorcycle / moped rental service, which offers to its members the possibility to book a motorcycle or moped by the hour or day. The online booking (through websites or mobile apps) is available 24 hours a day, 7 days per week. Reservation, pickup and return are done on a self-service basis. Usually the vehicle locations are geographically distributed and unattended. E.g. Yego, Vulog, Helbiz, MiMoto, etc.

- Bike sharing/Bike rental: The possibility to borrow a bike either by paying only the usage time or by paying a fee for the rental period. E.g.: Nextbike, Cyclocity, SmartBike, OV-fiets, Mobike Cloudbike, MOBIT, Vélib, Limebike, Ofo, etc.

THE QUESTIONS ON THE DESCRIPTION OF MOBILITY (PAGE 7-12) WHERE PROGRAMMED AS SHOWN BELOW:

<Ask for all trips (number of trips mentioned at Q16_1>
<Max 15 Trips>
Trip 1 – Trip 15

- **Trip Purpose**

<List of trip purposes: >

11 Return to home
12 Return to second home / occasional housing / hotel / other residence
21 Usual place of work
22 Work related (meeting / etc.)
23 Attend school as a student
31 Purchase groceries
32 Purchases other than groceries
41 Care / health
42 General errands (post office / formalities / seeking for employment / etc.)
43 Leisure / sports / cultural / library / associative activities
44 Restaurant / meal (go out for a meal / snack / carry-out)
51 Visiting friends or relative
61 Drop off /pick up someone: kindergarten / creche / school / childcare
62 Drop off /pick up someone: train station or airport
63 Other drop off /pick up (e.g: drop off: e.g: drop off someone to hospital, …
71 Other

- **Time of departure (hh:mm)**
  <Numerical field>

- **Time of arrival (hh:mm)**
  <Numerical field>

If (T0106 - T0103) < 0: ask to correct T0103 or T0106
<Program error check to see: if duration is over 150 minutes and distance under 350 km >
If an error is detected, ask the question "Could you confirm that the duration is over: 2h30?]
- Yes [programmer: go to next question]
- No, [programmer: go back to correct the answer]

- **ZIP code departure or** I don't know or refuse to answer
  <Text field>
  <IF T00 = yes, autofill with answer from Q00 (home zip code)>

<Program error check to see if postal code format matches the country specific format>
<Add option "Abroad" in case Zip code is not in country of residence>

- **ZIP code arrival or** I don't know or refuse to answer
  <Text field>
  <Program error check to see if postal code format matches the country specific format>
  <Add option "Abroad" in case Zip code is not in country of residence>

- **Overall distance (km)**
  <Numerical field>

Distance (mi or km) but with one decimal
If trip 3000 km (2000 miles) < T0107 then ask, "Do you confirm that this trip is over 3000 km (2000 miles)"
- Yes [programmer: go to next question]
- No, [programmer: go back to correct the answer]

If (T0106 - T0103) > 150 and T0107 < 350: ask Do you confirm that this trip is over 2.5 hours.
- Yes [programmer: go to next question]
- No, [programmer: go back to correct the answer]

- **What was the total number of persons who were travelling with you from the origin to the destination during this trip (including yourself)?**
  <Numerical field>

if TXX08 > 10. Message to say: "Were you accompanied by more than 9 persons?"
- Yes [programmer: go to next question]
- No, [programmer: go back to correct the answer]

- **How many stages has this trip?**
  <Numerical field>

- **Which travel modes did you use for this stage?**
  <Ask for each stage of the trip>
  <Show new line for each stage based on question "How many stages has this trip?">
  <IF only one stage:
- Autofill the duration based on the answers for time of departure and time of arrival.
- Autofill the distance based on the answer for overall distance.
- <IF sum distances of the stages is higher than distance of the total trip show:
  Alert: The sum of the distances of the stages cannot be higher than the distance of the total trip.
- <IF sum of duration of the stages does not fit between departure time and arrival time show:
  Alert: The sum of the durations of the stages does not fit between departure time and arrival time.

	Travel Mode		Travel Mode Type	Dur. (min)	Dur. (km)
1	**Walking only or personal transportation device**	1.1	Walking only		
		1.2	Skate / rollerblade / scooter		
		1.3	Electric personal transportation device (Onewheel / Hoverboard / Caster board / Electric unicycle / Electric scooter / Electric skates / Electric skateboard)		
		1.4	Wheelchair (including motorised)		
2	**Bicycle**	2.1	Privately owned electric bike		
		2.2	Privately owned bike (not electric)		
		2.3	Electric bike sharing / Rental bike		
		2.4	Bike sharing / Rental bike (not electric)		
3		3.1	Privately owned or on lease or company electric or hybrid car		

	Car / light commercial vehicle as driver	3.2	Privately owned or on lease or company car (not electric or hybrid)		
		3.3	Electric car sharing		
		3.4	Car sharing (not electric)		
		3.5	Rental car		
		3.6	Other car / golf cart		
4	**Car / light commercial vehicle as passenger**	4.1	Privately owned or on lease or company electric or hybrid car		
		4.2	Privately owned or on lease or company car (not electric or hybrid)		
		4.3	Electric car sharing		
		4.4	Car sharing (not electric)		
		4.5	Rental car		
		4.6	Ride Hailing (taxi/ Uber / Lyft / etc...)		
		4.7	Other car / golf cart		
5	**Motorcycle / Moped as driver**	5.1	Motorcycle / moped electric (Privately owned or on lease)		
		5.2	Motorcycle / moped not electric (Privately owned or on lease)		
		5.3	Electric motorcycle or Moped sharing		
		5.4	Motorcycle or Moped sharing (not electric)		
		5.5	Rental Motorcycle / moped		
		5.6	Ride Hailing		
6	**Motorcycle / Moped as passenger**	6.1	Motorcycle / moped electric (Privately owned or on lease)		
		6.2	Motorcycle / moped not electric (Privately owned or on lease)		
		6.3	Electric motorcycle or Moped sharing		
		6.4	Motorcycle or Moped sharing (not electric)		
		6.5	Rental Motorcycle / moped		
		6.6	Ride Hailing		
7	**Urban public transport**	7.1	Bus or trolleybus		
		7.2	School bus		
		7.3	Tramway		
		7.4	Metro		
		7.5	Suburb train		
		7.6	Cable car or a funicular railway		
8	**Other**	8.1	High-speed train		
		8.2	Other train		
		8.3	Coach		
		8.4	Airplane		
		8.5	Boat		
		8.6	Van / Lorry / Tractor etc.		
		8.7	Passenger in specialised transportation (handicapped)		
		8.6	Other		

Stage level data control:

<Program error check to see: If travel mode in ((Walking only or personal transportation device / Bicycle / Urban public transport) then stage duration < 150 minutes >
If an error is detected, ask the question "Could you confirm that the duration is over: 2h30?"]
- Yes [programmer: go to next question]
- No, [programmer: go back to correct the answer]

<Program error check to see:
If travel mode in (Walking only or personal transportation device / Bicycle / Urban public transport) then Stage DISTANCE < stage duration * 40 / 60 (=> Speed under 40 km/h)
If travel mode in (Car / light commercial vehicle / Motorcycle / Moped) then Stage DISTANCE < stage duration * 200 / 60 (=> Speed under 200 km/h)>
If an error is detected, ask the question "Could you confirm that the distance is over: stage duration * speed limit / 60?]
- Yes [programmer: go to next question]
- No, [programmer: go back to correct the answer]

<IF 3. Car / light commercial vehicle as passenger OR 6. Motorcycle / Moped as passenger are selected ask: >

- **How did you connect to the driver for this ride?**

1. By internet or a smartphone application
2. At work (colleagues)
3. By personal relationship (family, friends)
4. By hitchhiking
5. Other

NOTES: Add a warning / extra question to the respondent if the trip do not end at home as we have respondents not having the last trip being to their home.

If last trip purpose is not "11 Home": send a message "If you return to your home at the end of the day, please describe this last trip".

- Yes [programmer: please describe this/these trip(s)]
- No, [programmer: go to next question]

If a "privately owned or on lease or company" car is used during that day (ask Q18)

Q18. Why did you take your car to undertake your activities? (more than one answer can be ticked)

1. There is no public transport alternative for at least one of the trips
2. The public transport stop is very far from my home or from my destination
3. The public transport is unreliable
4. The car is faster
5. The car is cheaper
6. The car is more comfortable
7. The car is flexible of use (we can decide when to depart, ...)
8. I need the car for my work
9. I had to drop children at school/pick up children from school
10. I had to escort some people (other than children)
11. I had to carry equipment
12. I need a car at destination
13. Other: …

How has the COVID pandemic affected your travel behavior. We propose two options (either no link with the travel diary or link with the travel diary)

Q18B: Has your travel behavior changed because of the COVID-19 pandemic?

1. Yes, my travel behavior changed a lot because of the COVID-19 pandemic.
2. Yes, my travel behavior changed a little because of the COVID-19 pandemic.
3. No, my travel behavior has not changed because of the COVID-19 pandemic.

If Q18B = 1 or 2

Q18C: Compared to a similar day before the pandemic, the number of daily trips:

1. Decreased
2. Was about the same
3. Increased/

If Q18B = 1 or 2

Q18D: Compared to a similar day before the pandemic, the length of the trips:

1. Decreased
2. Was about the same

3. Increased/

If Q18B = 1 or 2

Q18E: How has the mode of transport changed?				
	1. Less	2. About the same	3. More	4. Not applicable (E.g. it was not used before)
Q18E01: Walking / skating				
Q18E02: Electric personal transportation device				
Q18E03 : Bicycle				
Q18E04 : Motorcycle / Moped				
Q18E05 : Car as driver				
Q18E06 : Car as passenger				
Q18E07 : Public transport				

The following questions (V0101 to V0207) are activated if the response to Q12 is >0
Filter if Q12 = 1 then asks questions V0101 to V0107
Filter if Q12 > 1 then asks questions V0101 to V0207

Please describe the privately owned or leased or company cars available in your household.

Let's start with the car you used most often on DD-1/MM/YYYY (day of the trip diary) or, if you did not use any car on DD-1, let's start with the car that you generally use most of the time.

For V0103 and V0104 your car registration card may help
V0101. What is the brand of the car? (i.e. Volkswagen)
Brand
I don't know or refuse to answer

V0102. What is the model name of the car? (i.e. "Golf")
Model Name
I don't know or refuse to answer

V0103. When was the car manufactured? (Year only)

YYYY

I don't know or refuse to answer

V0104. What is the engine size of the car (in cm3)?

1. Under 799 cm3
2. from 800 cm3 to 1199 cm3
3. From 1200 to 1399 cm3
4. From 1400 to 1699 cm3
5. From 1700 to 1999 cm3
6. From 2000 to 2399 cm3
7. 2400 cm3 or more
8. I don't know or refuse to answer

V0105. What is the fuel type of the car?

1. Petrol
2. Diesel
3. Petrol-hybrid
4. Diesel-hybrid
5. Electric Vehicle (E.V.)
6. LPG
7. Hydrogen / Fuel Cells
8. Biomethane / CNG
9. Other
10. I don't know or refuse to answer

If petrol hybrid or diesel hybrid (ask V0106)

V0106. Is it a plug-in Hybrid Electric Vehicle?

A hybrid electric vehicle with rechargeable batteries that can be restored to full charge by connecting a plug to an external electric power source

1. Yes
2. No
3. I don't know or refuse to answer

V0107. Are you the main user of this car?

1. Yes as driver
2. Yes as passenger
3. No
4. I don't know or refuse to answer

Let's describe a second car

For V0203 and V0204 your car registration card may help

V0201. What is the brand of the car? (i.e. Volkswagen)

Brand

I don't know or refuse to answer

V0202. What is the model name of the car? (i.e. "Golf")

Model Name

I don't know or refuse to answer

V0203. When was the car manufactured? (Year only)

YYYY
I don't know or refuse to answer

V0204. What is the engine size of the car (in cm3)?

1. Under 799 cm3
2. from 800 cm3 to 1199 cm3
3. From 1200 to 1399 cm3
4. From 1400 to 1699 cm3
5. From 1700 to 1999 cm3
6. From 2000 to 2399 cm3
7. 2400 cm3 or more
8. I would rather not say or refuse to answer

V0205. What is the fuel type of the car?

11. Petrol
12. Diesel
13. Petrol-hybrid
14. Diesel-hybrid
15. Electric Vehicle (E.V.)
16. LPG
17. Hydrogen / Fuel Cells
18. Biomethane / CNG
19. Other
20. I would rather not say or refuse to answer

If petrol hybrid or diesel hybrid (ask V0206)

V0206. Is it a plug-in Hybrid Electric Vehicle?

A hybrid electric vehicle with rechargeable batteries that can be restored to full charge by connecting a plug to an external electric power source

4. Yes
5. No
6. I don't know or refuse to answer

V0207. Are you the main user of this car?

5. Yes as driver
6. Yes as passenger
7. No
8. I don't know or refuse to answer

Filter if Q13 >0 then ask questions V0301 to V0307

Please describe the motorcycle/moped that you use most often
For V0303 to V0305 registration motorcycle/moped card may help

V0301. What is the motorcycle / moped brand (i.e. Vespa)?

alphanumeric
I don't know or refuse to answer

V0302. What is the motorcycle / moped type (i.e. "Primavera")?

alphanumeric
I don't know or refuse to answer

V0306. What is the fuel type of the motorcycle / moped ?

1. Petrol
2. Petrol-hybrid
3. Electric (E.V.)
4. Other
5. I do not know or do not want to answer

if V0306 is not electric

V0303. What is the engine displacement (Cylinder capacity) (in cm3) of the motorcycle/moped?

1. Under 50 cm3
2. from 51 cm3 to 125 cm3
3. From 126 to 250 cm3
4. From 251 to 450 cm3
5. From 451 to 600 cm3
6. From 601 to 800 cm3
7. 800 cm3 or more
8. I do not know or do not want to answer

if V0306 is not electric

V0304. What is the type of engine of the motorcycle /moped?

1. Two-stroke (or two-cycle) engine
2. Four-stroke (also four-cycle) engine
4. I do not know or do not want to answer

V0305. When was the motorcycle/moped manufactured? (Year only)

YYYY
I do not know or do not want to answer

V0307. Are you the main user of this motorcycle/moped, among the household members?

1. Yes
2. No
3. I would rather not say or refuse to answer

If Q14>0 (ask question V0401 to V0402)

Please describe a bike that is available for daily use in your household. Please describe the adult bike that is used most frequently.

V0401. What type is the bike?

1. Regular-standard bikes
2. Pedal assist e-bike
3. Power-on-demand e-bikes
4. E-bike but I do not know pedal assist or power on demand
5. I do not know or do not want to answer

V0402. How often is the bike used?

1. More than 5 days in a week
2. 4 or 5 days in a week
3. 2 or 3 days in a week
4. Once a week
5. Less than once a week
6. I do not know or do not want to answer

If How many electric personal transportation devices are available > 0 (ask question V0501 to V0503)

Please describe the electric personal transportation device that you use most frequently.

V0501. What is the type of the electric personal device?

1. Onewheel
2. Hoverboard / Caster board
3. Electric unicycle
4. Electric scooter
5. Electric skates
6. Electric skateboard
7. Other
8. I do not know or do not want to answer

V0502. Are you the main user of the electric personal device, among the household members?

1. Yes
2. No
3. I do not know or do not want to answer

V0503. How often is the electric personal device used?

1. More than 5 days in a week
2. 4 or 5 days in a week
3. 2 or 3 days in a week
4. Once a week
5. Less than once a week
6. I do not know or do not want to answer

Type of electric personal transportation device

Onewheel: Self-balancing electric personal transporter, on which the user stands and places feet perpendicular to the direction of travel, on front and back platforms.
Hoverboard (Synonym: self-balancing board): Self-balancing micro-vehicle consisting of two motorised wheels connected to a pair of articulated pads on which the rider places their feet. The rider controls the speed by leaning forwards or backwards, and direction of travel by twisting the pads.
Electric unicycle (abbreviated: EUC): Self-balancing electric personal transporter with a single wheel. The rider controls the speed by leaning forwards or backwards, and steers by twisting the unit using their feet. Some dual-wheel models exist, but the principle remains that of a single axle device, used with feet in the direction of travel and placed either side of the wheel(s).
Electric scooter (Synonym: Standing Electric Scooter): A stand-up or seated scooter that can be propelled by the electric motor itself, irrespective of the user kicking.
Electric skateboard (e-skateboard): Skateboard with electric battery, motor, and wireless remote controller.

Electric skates (e-skates): Skates with electric battery and motor, controlled by the user leaning forward or backward or using a remote controller.

The question has to be filtered for the regions where the service exists

	Ride sharing/car pooling? (E.g. Blablacar, Klaxit, Carpooling, iDVROOM, Europe-carpooling, Mobicoop, Kowo, etc.)	**Ride hailing?** (E.g. Taxi, Uber, Lyft, etc.)	**Car sharing?** (E.g. Zipcar, Car2Go, Drive now, Share Now, Cambio, Getaround, CarAmigo, Emov, Pony, etc.)	**Motorcycle / moped sharing? (**E.g. Yego, Vulog, Helbiz, MiMoto, etc.**)**	**Bike sharing/bike rental?** (E.g. Nextbike, Cyclocity, SmartBike, OV-fiets, Mobike Cloudbike, MOBIT, Vélib, Limebike, Ofo, etc.)
	01	02	03	04	05
Q19. Where you live, have you ever used 1. Yes 2. No 3. I do not know or do not want to answer	**Q1901**	**Q1902**	**Q1903**	**Q1904**	**Q1905**

Pop up windows with definitions for questions : Q20, Q21, Q22 et Q23
If yes to "Have you ever used ride sharing/car pooling where you live?"

Q20. What were the reasons for using ride sharing/car pooling? (Multiple responses possible)

1. Moving/commuting in the living area
2. Moving in the city and its surroundings
3. During holidays
4. I do not know or do not want to answer

Q21. Do you use ride sharing/car poolingg as:

1. Driver
2. Passenger
3. Sometimes driver and sometimes passenger
4. I do not know or do not want to answer

If yes to "Did you ever use ride hailing where you live?"

Q22. Do you use ride hailing as:

1. Driver
2. Passenger
3. Sometimes driver and sometimes passenger
4. I do not know or do not want to answer

If yes to "Did you ever use bike sharing/Bike rental where you live?"

Q23. What type of bike sharing/Bike rental do you use?

1. Always Regular-standard bikes
2. Always E-bike
3. Sometimes regular standard bike and sometimes e-bike
4. I do not know or do not want to answer

	if yes to ride sharing/car pooling **as passenger**	if yes to ride hailing **as passenger**	if yes to car sharing	if yes to motorcycle / moped sharing	if yes to bike sharing/bike rental
	Ride sharing/car pooling as passenger? (e.g. Blablacar, iDVROOM, Europe-carpooling, mobicoop, etc))	**Ride hailing as passenger?** (e.g.taxi and Uber, Lyft)	**Car sharing?** (e.g. DriveNow, Zipcar, Car2Go, Cambio, Drivy, CarAmigo ...)	**Motorcycle / moped sharing?**	**Bike sharing/Bike rental?**
	01	02	03	04	05
Q24. How often do you use this service? 1. Daily 2. Few times per week (2-4 times) 3. A few times per month 4. Less than once per month 5. Never 6. I do not know or do not want to answer	**Q2401**	**Q2402**	**Q2403**	**Q2404**	**Q2405**

We have reached the final question

Q25 What is your annual disposable household income?

Add 5 (quintile) income brackets and I do not know/refuse

The annual equivalised disposable household income by quintile

Let q_{ij} be the quintile i $(1 \leq i \leq 4)$ of the equivalised household income for the country j. Let u be the equivalisation factor of the household (sum of a weight of 1.0 to the first person aged 14 or more, a weight of 0.5 to other people aged 14 or more and a weight of 0.3 to people aged 0-13).

Q25 : What is your annual disposable household income?

1. Less than $u \times q_{1j}$
2. Between $u \times q_{1j}$ and $u \times q_{2j}$
3. Between $u \times q_{2j}$ and $u \times q_{3j}$
4. Between $u \times q_{3j}$ and $u \times q_{4j}$
5. More than $u \times q_{4j}$

Note: The disposable income, is the amount of money that households have available for spending and saving after income taxes have been accounted for.

End
Thank you for your time!

Abbreviations

AD	All days
AIC	Average interview Duration
CAPI	Computer-assisted personal interview
CATI	Computer-assisted telephone interview
CAWI	Computer-assisted web interview
EC	European Commission
EU	European Union
EUROSTAT	Statistical Office of the European Union
EPV	Electric Personal Device
FUA	Commuting zone in the EC-OECD definition of Functional Urban Areas
GDP	Gross Domestic Product
MS	Member State
NWD	Non-working day
PC	Personal computer
PDA	Personal Digital Assistant
PKM	Passenger-kilometres
RDD	Random digit dialing
TRACCS	Transport data collection supporting the quantitative analysis of measures relating to transport and climate change
WD	Working day
Yrs	Years

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