HARMONY

SPATIAL & TRANSPORT PLANNING FOR A NEW MOBILITY ERA

Holistic Approach for Providing Spatial & Transport Planning Tools and Evidence to Metropolitan and Regional Authorities to Lead a Sustainable Transition to a New Mobility Era

D3.1 Design of data collection techniques and tools

Submission date: 29.03.2021

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#harmony-h2020

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SUMMARY SHEET

PROJECT	
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1.1	01/12/2020	MOBY	Final version

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Executive Summary

This deliverable is part of WP3, and more specifically T3.1 “Design of data collection techniques and tools”. The goal of this deliverable is to present the sampling strategy and the data collection techniques and tools that will be used in HARMONY pilot areas to collect the data needed for modelling purposes in WP4 to WP8. More specifically, it focuses on designing the questionnaires, preparing and customising the smartphone-based travel survey tool for collecting primary data, designing the survey participants support interfaces (helpdesks), as well as developing the sampling strategies to be used in each pilot area.

For the pilot cities of Oxfordshire and Turin was designed a passenger survey for each one of them. The questionnaires for passengers will collect both quantitative and qualitative data regarding individual and household socio-economic characteristics, mobility tool ownership, attitudes and perceptions towards multimodality, traditional and new mobility services. Also, for Oxfordshire was designed two rounds of questionnaires for “before-after AV-bus freight demonstrations” and two rounds “before and after unmanned aerial flying vehicles (UAVs) freight demonstrations”. For Rotterdam, two round “before and after AV-bus freight demonstration” was developed. Also, State-of-the-art experiments using serious gaming techniques were designed to capture individual’s preferences for a residential location, mobility tool ownership, mode choice, app-based mobility usage and spatiotemporal activity changes given new mobility services and spatial policies. The questionnaires for the freight stakeholders in Rotterdam and Oxfordshire are also designed to collect information about their decisions and barriers to adopting new technologies (i.e., AVs and unmanned aerial flying vehicles (UAVs)) or services (i.e., crowd-shipping). For pilot city of Trikala, four rounds of questionnaires (two for pharmacists and two for residents) was designed for the “before and after” unmanned aerial flying vehicles (UAVs) freight demonstrations. Also, an online questionnaire after unmanned aerial flying vehicles (UAVs) freight demonstration was designed for the residents of the broader area of Trikala as well.

The passenger and freight questionnaires were translated for each case study area in the local language. Table 1 (page 9) presents the survey tools that are designed for each of the HARMONY metropolitan areas. Finally, this deliverable presents the Ethics and GDPR forms that will accompany the surveys, as well as the storage of the collected data

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Disclaimer

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List of Abbreviations

Abbreviations	
MaaS	Mobility as a Service
HARMONY MS	HARMONY model suite
RP	Revealed Preference
SP	Stated Preference
AV	Autonomous Vehicle
UAVs	Unmanned Aerial Flying Vehicles

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1. Introduction

1.1. Project Summary

The importance of integrated spatial and transport planning in regional and urban policy making stems from the fundamentally interdependent relationship of land-use, transport demand and transport supply. The adoption of an integrated approach would offer the possibility to local authorities to steer urban development towards simultaneously pursuing economic competitiveness, social cohesion, mobility and environmental sustainability. Even more critical in the current situation where the latest development in innovative mobility services and technology might significantly influence the mobility system.

The HARMONY project envisages developing a new generation of harmonised spatial and multimodal transport planning tools which comprehensively model the dynamics of spatial organisation and changing transport sector taking into consideration the dynamics that new services and technologies introduce.

The main goal of the HARMONY project is to develop a Model Suite (MS) as a multi-scale, software-agnostic, integrated activity-based model system. This model enables end-users to link independent models and analyse a portfolio of regional and urban interventions for both passenger and freight mobility. These interventions would include policies and capital investments, land-use configurations, economic and sociodemographic assumptions, travel demand management strategies and new mobility service concepts. The main objective behind the model system's architecture is to enable the evaluation of such interventions with regards to their impact on land-use, economic growth, transportation networks, energy, vehicular noise and emissions, while, at the same time, provide recommendations for Sustainable Urban Mobility Plans (SUMPs) of the new mobility era.

HARMONY aims to apply the integrated model system (or part of it) in four metropolitan areas and evaluate the impact of different modelling exercises and spatial or transport planning scenarios

1.2. Document Scope

This deliverable is part of WP3, and more specifically T3.1 "Design of data collection techniques and tools". The goal of this deliverable is to present the sampling strategy and the data collection techniques and tools that will be used in HARMONY pilot areas to collect the data needed for modelling and analysis purposes in WP3 to WP8. More specifically, it focuses on designing the questionnaires, preparing and customising the smartphone-based travel survey tool for collecting primary data, designing the survey participants support interfaces (helpdesks), as well as developing the sampling strategies to be used in each pilot area.

For the pilot cities of Oxfordshire and Turin was designed a passenger survey for each one of them. The questionnaires for passengers will collect both quantitative and qualitative data regarding individual and household socio-economic characteristics, mobility tool ownership, attitudes and perceptions towards multimodality, traditional and new mobility services. Also, for Oxfordshire was designed two rounds of questionnaires for "before-after AV-bus freight demonstrations" and two rounds "before and after unmanned aerial flying vehicles (UAVs) freight demonstrations". For Rotterdam, two round "before and after AV-bus freight demonstration" was developed. Also, State-of-the-art experiments using serious gaming techniques were designed to capture individual's preferences for a residential location, mobility tool ownership, mode choice, app-based mobility usage and spatiotemporal activity changes given new mobility services and spatial policies. The questionnaires for the freight stakeholders in Rotterdam and Oxfordshire are also designed to collect information about their decisions and barriers to adopting new technologies (i.e., AVs and unmanned aerial flying vehicles (UAVs)) or services (i.e., crowd-shipping). For pilot city of Trikala, four rounds of questionnaires (two for pharmacists and two for residents) was designed for the "before and after" unmanned aerial flying vehicles (UAVs) freight demonstrations. Also, an online questionnaire after unmanned aerial flying

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vehicles (UAVs) freight demonstration was designed for the residents of the broader area of Trikala as well.

The passenger and freight questionnaires were translated for each case study area in the local language. Table 1 below presents the survey tools that are designed for each of the HARMONY metropolitan areas. Finally, this deliverable presents the Ethics and GDPR forms that will accompany the surveys, as well as the storage of the collected data.

Table 1: Survey tools designed for each HARMONY metropolitan area to collect primary data

Rotterdam (NL)	Freight stakeholders - Interview questionnaires with serious games Freight stakeholders - Interview questionnaire about the experience of AV demonstration: - Before the AV demonstration - After the AV demonstration
Oxfordshire (UK)	Passenger travel survey in the County including: - Household questionnaire (Revealed preference; RP) - Individual questionnaire (RP) with Stated preference scenarios (SPs) about: o Mobility tool ownership and usage, o Mode choice, and o Dynamic travel planning within the day - Activity diary (RP)
	Passenger survey for AV demonstration
	Freight stakeholders - Interview questionnaire about the experience of AV demonstration: - Before the AV demonstration - After the AV demonstration
	Freight stakeholders: Interview questionnaire about the experience of unmanned aerial flying vehicles (UAVs) demonstration: - Before the AV demonstration - After the AV demonstration
Turin (IT)	Passenger travel survey including: - Household questionnaire (Revealed preference; RP) - Individual questionnaire (RP) with SPs about: o Mobility tool ownership and usage, o Mode choice, and o Dynamic travel planning within the day - Activity diary (RP)
Trikala (GR)	- Interview questionnaires for pharmacists and residents (paper-based) before demonstration - Interview questionnaires for pharmacists and residents (paper-based) after demonstration
	Online questionnaire for the wider population of Trikala with SPs

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1.3. Document Structure

This document is comprised of the following chapters:

Chapter 1 provides an introduction to the project and the objective of this deliverable
Chapter 2 provides an overview of the Passenger survey of all pilot cities that will take part on this survey. It presents the MOBYapp which will be used to collect all the necessary data and all questionnaires that have been designed including stated preference experiments and the sampling strategy
Chapter 3 presents all the surveys tools that have been developed for the pilot city of Turin
Chapter 4 includes all the surveys tools that have been developed for the pilot city of Rotterdam
Chapter 5 presents all the surveys tools that have been developed for the pilot city of Oxfordshire
Chapter 6 includes all the surveys tools that have been developed for the pilot city of Trikala
Chapter 7 explains the Ethical aspects of exchanging, archiving and preservation of data and provides the informed Consent
Chapter 8 concludes the document
Chapter 9 provides the Bibliography that was used to write this report

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2. Passenger travel demand surveys (Oxfordshire and Turin)

The Tactical Passenger simulator is an independent set of models which form into a transport demand simulator model system. The main objective of the system is to model and generate demand for activities and travel in the study area of application. The activity-based modelling approach followed is based on a high temporal and spatial aggregation and a strong behavioural basis. The engagement in an activity is formed through the dynamic interaction of household needs, tasks and constraints. While there is an increasing adoption of activity-based models by US metropolitan planning organizations, their application in Europe is still relatively limited. One of the main challenges behind the development of a fully agent-based model is the disaggregated data required at the level of households and individuals, which are hard and costly to collect.

In this context, the purpose of the passenger survey is to collect quantitative and qualitative data concerning individual and household socio-economic characteristics, mobility tool ownership, attitudes and perceptions towards mobility-related issues (e.g., multimodality, usage of traditional and new mobility services) and dynamic demand factors. These data are specifically required to,

i) Generate the synthetic population of the simulated agents with their corresponding attributes at the Strategic level,
ii) Enhance the synthetic population with additional variables on long-term household and individual choices that are required in the activity-based model (e.g., vehicle and subscription ownership, remote working)
iii) Develop core models for the activity and travel patterns generation at the Tactical level (e.g., mode choice)
iv) Design the within-day re-evaluation and day-to-day learning modules, which capture the inherent dynamicity and evolution of habitual activity schedules, in presence of travel time variation and unexpected events, at the Operational level.

This chapter presents the MOBYapp, which is used to collect all necessary data for passenger travel demand surveys. Also, sampling strategy and methodology for the passenger survey for each pilot city: Turin and Oxfordshire and the respective questionnaires that includes revealed preference and attitudinal questions, as well as stated preference experiments. The stated preference data collected in Oxfordshire and Turin will allow for capturing the uncertainty brought forth by emerging mobility services (e.g., MaaS) and novel transport modes (e.g., AVs) in the decision-making process. This type of data is essential as their application in the real world is still fairly limited, thus individuals do not have perfect knowledge about the attributes of future choice alternatives.

2.1. The tool: MOBYapp

This Section provides information about the MOBYapp, which will be used as an activity diary and will also host the questionnaires and SPs for Turin and Oxfordshire, presented in Section 2.2.1. Also, in this Section (2.1.), we provide the link and the instructions for downloading the MOBYapp in the user's smartphone. The link provided redirects users to Google Play or the Apple Store, depending on the user's smartphone. The MOBYapp is uploaded by MOBY X. The application is developed in Apache Cordova (with vue.js as the frontend framework) so as to target multiple platforms with one code base. It uses the Cordova-background-geolocation-lt plugin for location-tracking and RESTful web services as the backend infrastructure (server-side) for user authentication and posting the collected data. The backend system is implemented with Node.js framework.

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2.1.1. Introduction

The MOBYapp system is an automated survey system and platform developed by MOBY X Software to collect detailed multi-day data on travel and activity patterns for use in urban and transportation planning, modelling and analysis. The system has undergone rigorous testing and refinement and represents the state-of-the-art in GPS-based travel survey systems. The MOBYapp survey system consists of three key technology components (Figure 1):

- The smartphone app (Android and iOS) that collects raw data, such as GPS, GSM, Wi-Fi and accelerometer;
- The server that stores the collected data as well as contextual databases, and processes it using machine learning algorithms to detect trips and stops and infer activities;
- The web interface that enables users to interact with and verify their processed data via an Activity Diary. The web interface also provides a survey management system to those who organise the survey to supervise the progress of the survey and check key statistics of the collected data via infographics.

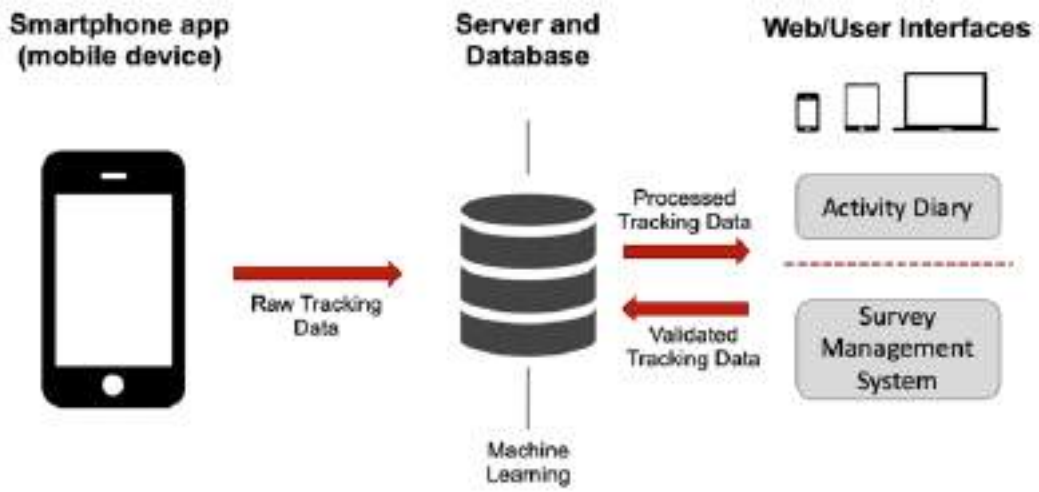

Figure 1: The MOBYapp architecture

The application is developed in Apache Cordova[1] (with vue.js as the frontend framework) so as to target multiple platforms with one code base. It uses the Cordova-background-geolocation-[2]lt plugin for location-tracking and RESTful web services as the backend infrastructure (server-side) for user authentication and posting the collected data. The backend system is implemented with Node.js framework.

After the successful installation of the application, the app starts to track the users' location for the designated period. The user can stop the tracking at any time. The MOBYapp allows users to track their daily trips and their route. At regular time intervals, the user is advised to validate their trips. The tracking application and validation will be tested in both pilot areas by members of the consortium.

The application uses the GPS to get location and the accelerometer or gyroscope to detect whether the device is moving, or it is stationary. When the device is detected to be moving, the app will automatically start recording locations. When the device returns to still mode and is detected as stationary for a certain period, all recorded data is posted to a remote web service. The data posted is

[1] https://cordova.apache.org/
[2] https://github.com/transistorsoft/cordova-background-geolocation-lt

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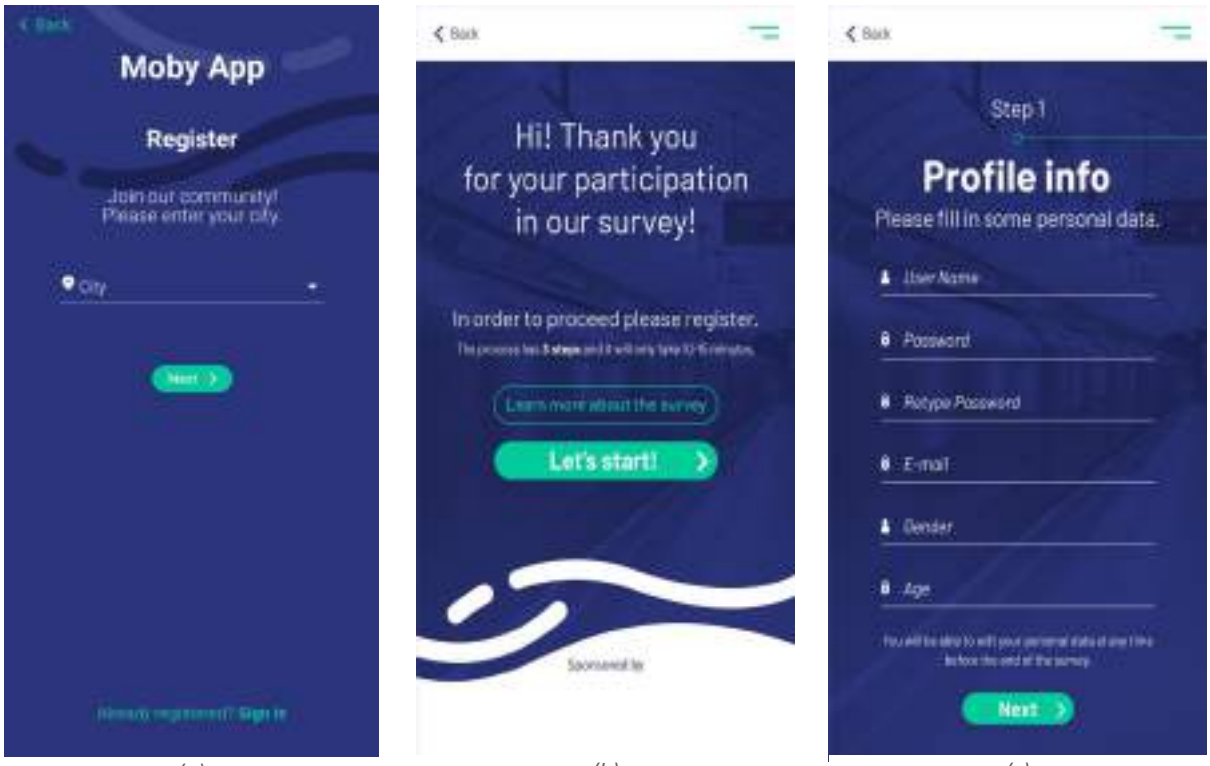
a collection of objects with the following attributes: timestamp, coordinates, speed, mode of transport (still / on foot/ in vehicle) and accuracy estimation (Probability/belief of transport mode).

2.1.2. Registration

Study participants will be first asked to register to the app (Figure 2(a)) providing their username, email and their password in order to proceed with the registration (Figure 2(c)). Also, individuals have to enter their gender and age to complete their personal information. The registration is necessary to be able for the user to participate in the survey.



(a) (b) (c)

Figure 2: Registration process

Once they register, they have to choose which is the pilot city they live in (Figure 2(a)). Given their residential location they will be assigned to a specific survey. The option of "Learn more about the survey" includes the link for the privacy policy and FAQ. The data that will be collected, will be GPS locked in the city/area, in which the survey will take place. Also, the selection of one of the pilot areas during the registration determines the exact questionnaires users will be presented with in the later stages of the survey. Once users complete the registration, they are sent an e-mail with confirmation of their username and password to be used when logging into the mobile application.

2.1.3. User centre

Once the individuals have registered, they are instructed to log in to the MOBYapp User Centre. The User Centre is a web-based platform, including a homepage which guides participants through the stages. The homepage of the User Centre gives an overview of the steps which need to be completed by the participant, namely:

1. Step 1: Download MOBYapp;
2. Step 2: Register;
3. Step 3: Complete the questionnaire; and

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4. 7-day activity diary.

All steps of the passenger survey are shown below (Figure 3):

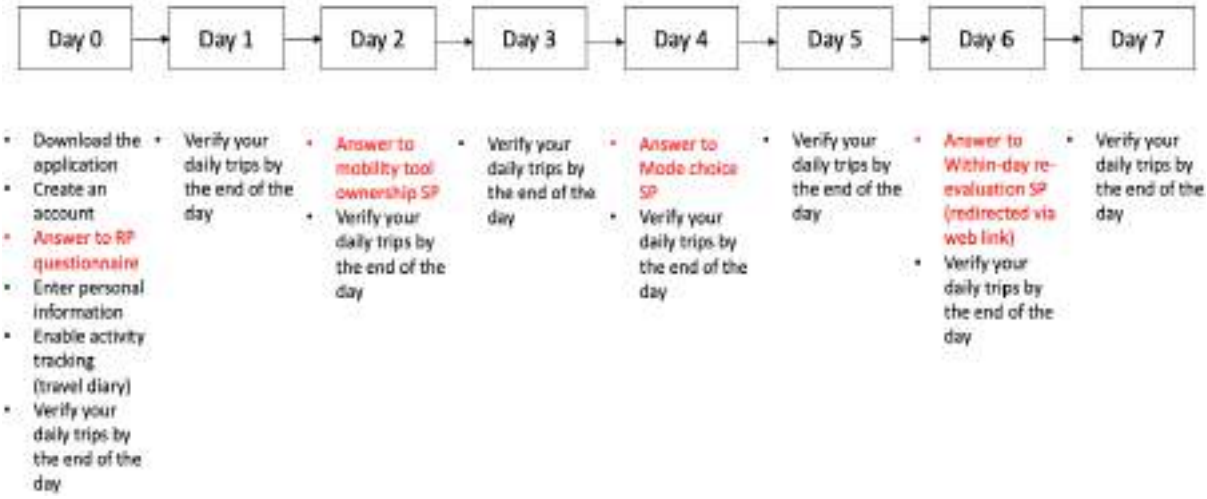

Figure 3:Timeline of data collection process

2.1.4. Interface of MOBYapp

2.1.4.1. Installation and setup

Once the MOBYapp is downloaded from Google Play or the Apple Store, users will access the app in their mobile phones by clicking on the MOBYapp icon. In the settings page, users can choose between English and Italian. They can also select when their data should be uploaded (upload only when Wi-Fi is available or use smartphone's data to upload them).

The user has to permit access to the app for the following:

- Location: needs to be ON while tracking trips;
- Notifications: needs to be allowed, in order the app to remind the users that they need to validate their daily trips at the end of the day;
- Cellular Data: needs to be ON, so that the app could acquire and display trip information. It is not necessary for trip tracking.

2.1.4.2. Using the MOBYapp

Opening the app for first time, a login screen is presented (Figure 4), for a user that has not logged in. Once the user is logged in, he/she sees the Home screen. There, the user is prompted to complete his/her profile by providing some mobility-related information. The user can also see notifications regarding the status of his/her participation in the survey (Figure 4). In login screen, the user will be able to login or request the password in case he/she forgot it.

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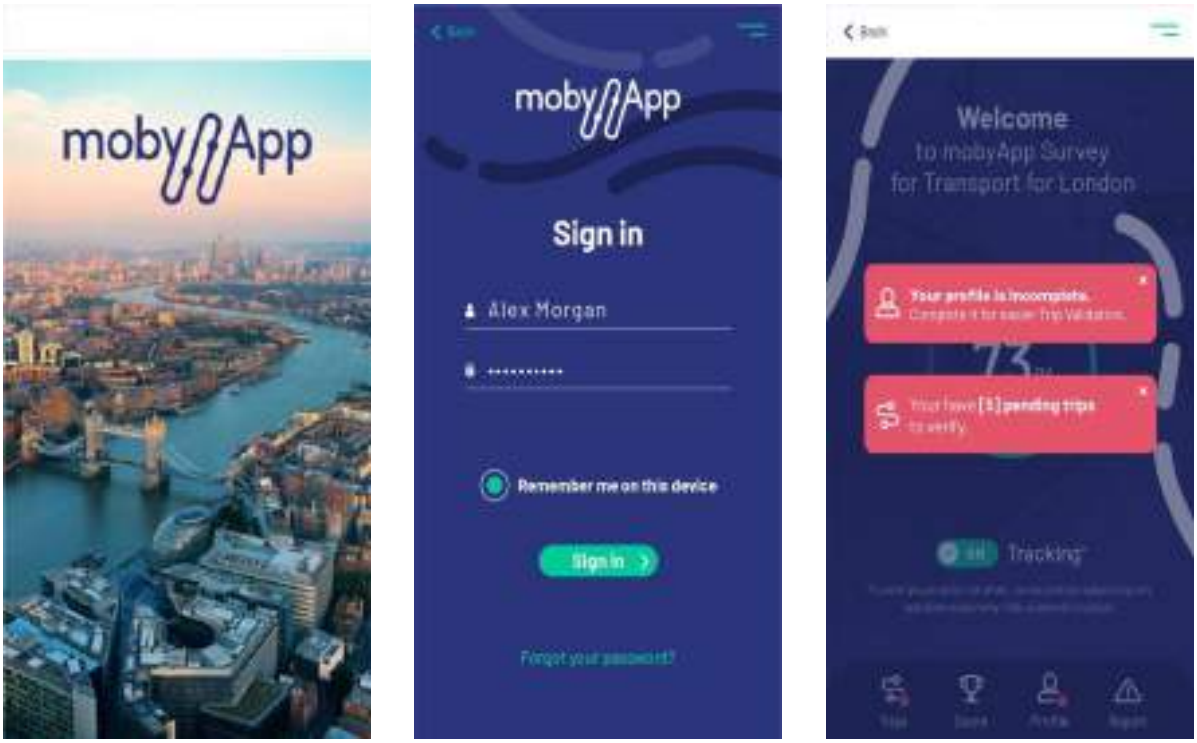

Figure 4: Login and complete your profile

In Home screen the user is prompted to complete his/her profile by providing some mobility-related information. In My Profile section of the app, the user can add more information that will assist

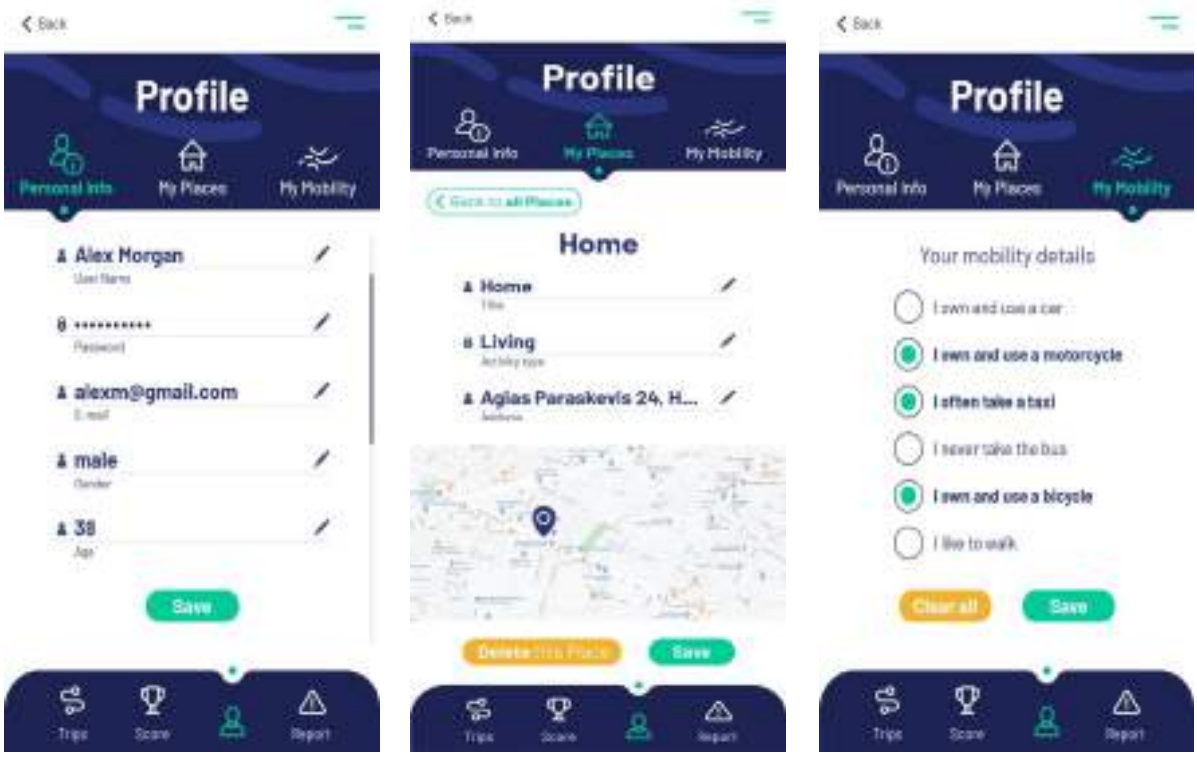

Figure 5: My Profile

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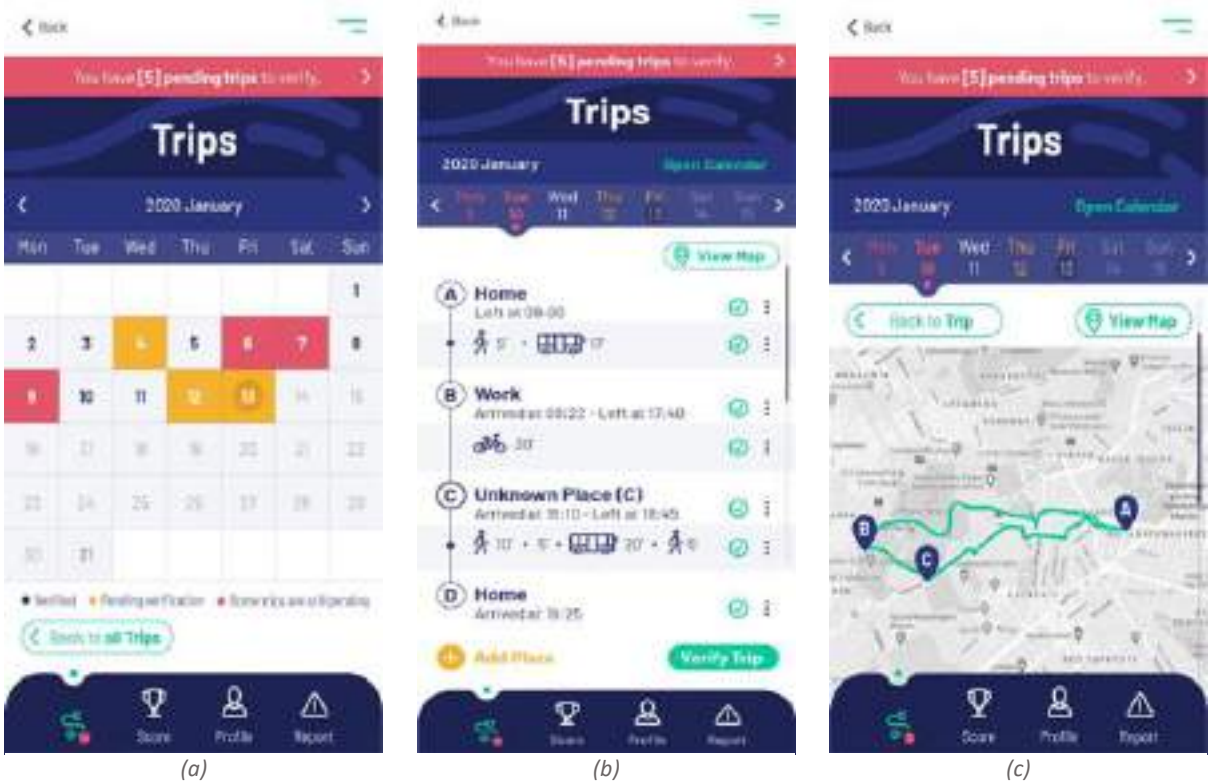
the algorithms to better classify and characterize the trips. These are divided to My Places, with the most frequently visited places and My Mobility where the user can add the most frequently used transport modes (Figure 5).

The user by the end of the day, has to verify his/her trips which can be seen in the calendar (Figure 6(a)). All activities are automatically generated by the MOBYapp application system and need to be validated by the users at the end of the day (Figure 6(b)). The validation includes:

- Location, and if they need to change it, they can enter an address or drag and drop to the desired location in the map;
- Arrival date and time;
- Transport mode used;
- Number of people accompanying them during the trip to the activity;
- Type of activity performed;
- Departure date and time.

The user can only view (not edit) previously verified trips. By clicking on a calendar date, sees the relevant page (verified trip or pending trip). The details of each logged day can be shown in a list or on a map. The user can also open a map to see a visualization of all his/her trips. On this map the user can move markers and display the address if he/she clicks on them (Figure 6(c)). Verified trips cannot be edited.



(a) (b) (c)

Figure 6: Calendar and verified trips

All trips pending verification, are grouped based on their date and the user can select which day he/she wants to verify (Figure 7(a)). Once the user selects a date, she/he can see all trips detected by the system (Figure 7(b)). If some places/stops are missing, then the user can add them. Verified activities and travels are indicated with an icon and different color. All unknown places or transport

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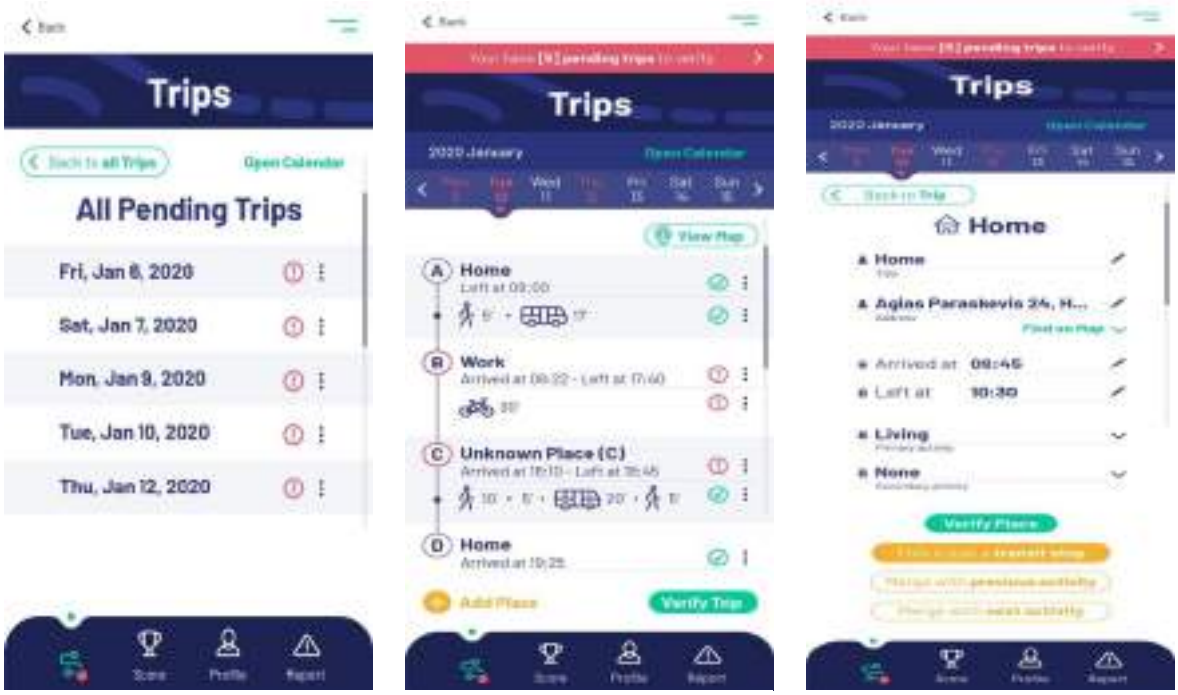
modes are shown as question marks. In order to edit the details of an activity or travel and verify it, the user must edit it, by pressing the pencil icon (Figure 7(c)). Verified activities and travels are indicated with some icon or color (Figure 7(b)).



(a) (b) (c)

Figure 7: Pending trips

Also, the user pressing the add place button (Figure 7(b)), can add activities and moves that the app's algorithm did not manage to track (Figure 8).

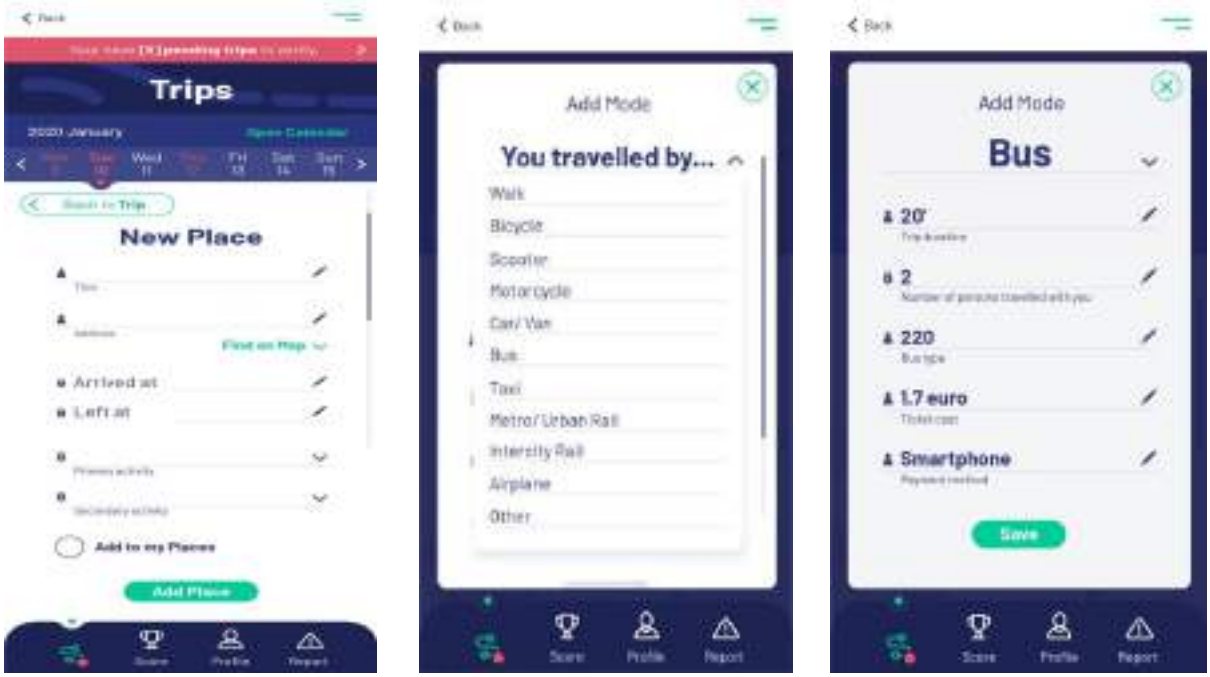


Figure 8: Add place or mode

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Users are able to report issues related to their trip or their experiences with MOBYapp via the Report Issue feature (Figure 9). In this feature users will be able to provide the following issue information:

- Subject / Category – selected from a list:
  - Traffic jam
  - Car accident
  - Service out of order
  - Technician problems with the vehicle
  - Problems with road network
  - Problems due to weather
  - Cancelations
  - Problem with real-time information
- Location (optional). It can be inserted as a google maps address or place or just retrieve the coordinates from current user location.
- Issue description (free text, optional)
- Use the Camera to take a picture (optional); and/or
- Use a picture from the picture gallery (optional).

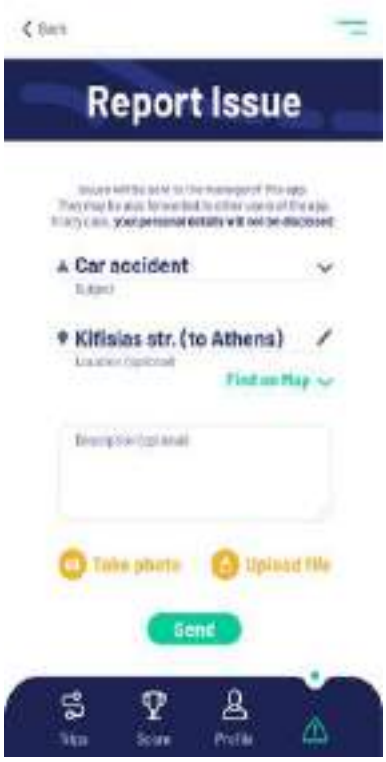

Figure 9: Report an issue

Users are also able to see statistics related to their trips or their experience under the Score screen (Figure 10):

- Trips (per selected period)
- Total distance (per selected period)
- Distance covered per mode (per selected period)
- Total travel time (per selected period)
- Travel time per mode (per selected period)
- CO2 emissions & CO2 emissions avoided (per selected period)
- Percentage of goal completed (verified trips / survey goal)

Figure 10: My score

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2.2. Passenger survey for Oxfordshire and Turin (Revealed Preferences)

2.2.1. Household Questionnaires for Oxfordshire and Turin

The questionnaire for passengers, for Turin and Oxfordshire (see Appendices 10.1 & 10.2), consists of three Sections. **Section 1** gathers information about people's socio-economic characteristics which can be used to understand the background of the sample better. It includes questions about age, gender, employment, education, household composition, income. **Section 2** collects information about their travel behaviour and examines private vehicle ownership, public transport usage, etc. It includes questions about driving licenses, car/scooter/bicycle ownership, public transport pass ownership and the usage of them. **Section 3** includes questions regarding the difficulties that people with disabilities face when they travel and the use of mobility related applications. It also includes attitudinal questions towards automation and COVID19, as well as for other health issues and data privacy concerns.

All the information that will be provided, will be aggregated, handled anonymously and used only for research purposes.

The objective of HARMONY for Turin and Oxfordshire is to apply the Strategic and Tactical simulators of the HARMONY Model Suite. A Passenger travel survey will take place in the metropolitan areas of Oxfordshire and Turin. This survey will consist of:

- Household questionnaire (Revealed preference; RP)
- Individual questionnaire (RP) with SPs-based on the satellite about:
  - Mobility tool ownership and usage,
  - Residential location choice,
  - Teleworking / Flexible working,
  - Mode choice, and
  - Dynamic travel planning within the day
- Activity diary (RP) (the input will be through Moby app)

All questionnaires can be found in Appendices 10.1 & 10.2.

2.3. Stated Preference experiments

2.3.1. Residential location choice experiments

An additional important model in the long-term choices setting is the residential location model. To explore future residential locations, re-location and dwelling type changes, we develop an SP that accompanies the remote work SP; given that recent studies correlate the work setting and the residential location choice. The residential location SP is presented to the same users responding to the remote work SP in a sequential way. The most popular work setting choice is used as a base and respondents are asked to consider residential choices in the newly stated remote work settings. This sub-survey is accompanied by an RP section which registers current home location, neighbourhood type, size, monthly rent (or purchase price), age of building, accessibility to local services and other residential specific variables that are not included in the introductory socio-demographic variables survey.

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Table 2: Residential choice SP design

Attribute	Levels
Neighbourhood type	• Urban or city center • Suburban • Rural
Monthly rent (or purchase price)	• Lower than current • Same as current • +10% of current • +20% of current • +50% of current
Dwelling type	• Flat • Detached house
Age of house	• 0-5 years • 6-10 years • 11-15 years • Older than 15 years
Relative size to current house	• Smaller • About the same size • +1 room • +2 rooms • +3 or more rooms
Local services	• No shops or services • Basic shops and services • Basic plus specialty shops and services
Travel time to work (or other PA)	• 15 minutes • 25 minutes • 40 minutes • More than an hour
Availability of reliable AV or shared AV vehicle or service	• Yes • No

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Figure 11: Residential choice dummy SP screenshot

2.3.2. Teleworking/Flexible Work SP

We focus on exploring the factors affecting the choice (and the extent to which this is an actual choice) to work or study remotely for two main reasons: The first one has to do with the remote work trend being especially relevant in the COVID-19 era to the extent that it is included frequently as an active response measure (usually as a percentage of workers or horizontally for education) and is likely to remain as an option for future scenarios regardless of the pandemic's course. The second reason has to do with the lack of census data capturing this drastic, recent change in remote work percentages and patterns. The lack of such data will affect the synthetic population aggregate totals and will not result in an accurate prediction of the BAU scenario.

For these two reasons we regard the remote work model as an important model of the long-term agent decisions model framework. The dependent variable includes various categories of remote work ranging from essentially in-person work to temporarily remote to fully remote (with distinction towards synchronous or asynchronous work). The model structure is planned to be a multinomial logit model and independent variables will include personal characteristics such as work sector, occupation, income, level of education, age, technological dependency of work, high speed internet availability, availability of laptops/tablets at household (considering also household member number). It should be

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noted that this is a long-term choice model which will result in a higher-level agent segmentation to remote workers (or students), which will change only in future scenario runs. For predicted, intermediate levels of remote work (such as partially remote or running work shifts) following models (daily agent scheduling) will predict the actual day-to-day decisions regarding whether the agent works from home or travels to work.

To explore the correlation of various socio-demographic and work-related variables with remote work availability and preferences we design a special remote work and residential choice survey which will be distributed to a subset of the total sample. The survey begins by exploring working arraignments such as work setting (remote, partially remote, flexible, fully office or out-of-home), work flexibility, work sector, wage, special work arrangements and workplace perks and is accompanied by a series of questions exploring the effect of COVID-19 measures in the work settings. Additionally, we ask the respondents to fill-in whether a potential decision to work remotely is mostly their own, it is decided on a higher management level or it is dictated by outside regulatory forces such as the government or other regulatory agencies.

To deepen the available data from RP, we design a stated-preference survey which collects data on long-term decisions of working remotely, work flexibility (to the extent that these two decisions are made by the respondent and not by the employer or other decision-maker) and also includes additional variables and attributes such as residential location and effect of presence of novel transport modes such as autonomous vehicles.

Table 3: Remote work choice SP design

Attribute	Levels	Specific to (AS)
Work setting	• Fully remote • Mostly remote (1 or 2 days per week at the office) • Split evenly between remote and office • Mostly office (1 or 2 days per week remotely • Mostly office	
Wage adjustment	• -10% of current wage • -5% of current wage • Wage is the same • +5% of current wage • +10% of current wage	
Access to utilities and tools required for work	• Restricted access to required tools from home • Partial access to required tools from home	All options excluding fully office

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	• Full access to required tools from home	
Amenities available at the office	• Leisure - socializing activities • Gym/Fitness equipment • Rest area • Food/Beverages	All options excluding fully remote
Work schedule	• Fixed • Partially flexible • Fully flexible	

The remote work model which will be developed is accompanied by a work flexibility model which is useful to predict spatial and temporal flexibility of work and to feed downstream models regarding agent schedules and activity scheduling. Both these models require specific questions included in the RP part of the survey, which explore the working situation of respondents, the effect that the pandemic had on their remote work patterns and insight for future scenarios.

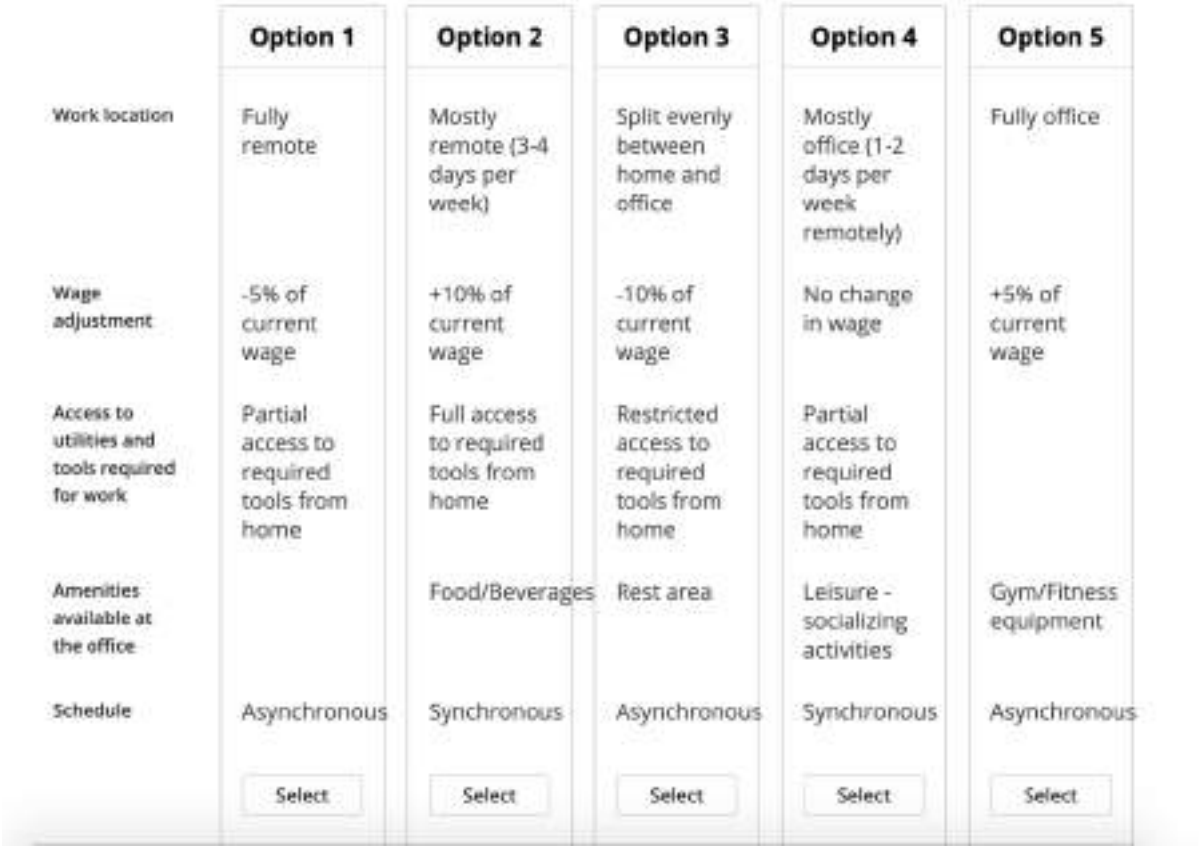

Figure 12: Dummy screenshot of remote work SP

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2.3.3. Mobility tool ownership experiments

2.3.3.1. Background and motivation

Rapid technological development has boosted the emergence of many different new mobility services and novel concepts in the transport field. For example, shared mobility services like car-sharing and ride-sharing are expected to reduce vehicle ownership and car usage; and highly autonomous vehicles are believed to be able to free drivers'/passengers' hands from behind the wheels. More recently, the concept of Mobility-as-a-Service (MaaS; Kamargianni et al., 2018) has obtained substantial research interest which facilitates multi-modal passenger travel and highlights the trend of shifting from "vehicle ownership" to "vehicle usership". However, since some mobility services are still in their early stage in the market or even still under development, it is not feasible to collect all the necessary revealed preference and behavioural data from the real-world market. Therefore, we will make use of stated preference survey to interpret people's preferences towards various characteristics of different new mobility tools and explain their choice behaviour.

2.3.3.2. Framework of the mobility tool ownership stated preference experiments

Figure 13 shows the general framework of this SP survey proposed for Turin and Oxfordshire demonstration at this initial stage. The stated preference (SP) survey will be made up of three parts: stated intention questions, stated choice experiment 1, and stated choice experiment 2.

It needs to be noted that a revealed preference (RP) survey will be presented prior to the SP survey. Part of the information revealed in the RP part will be used to feed into the subsequent SP survey, for example current household vehicle holdings and number of licenced drivers in the household.

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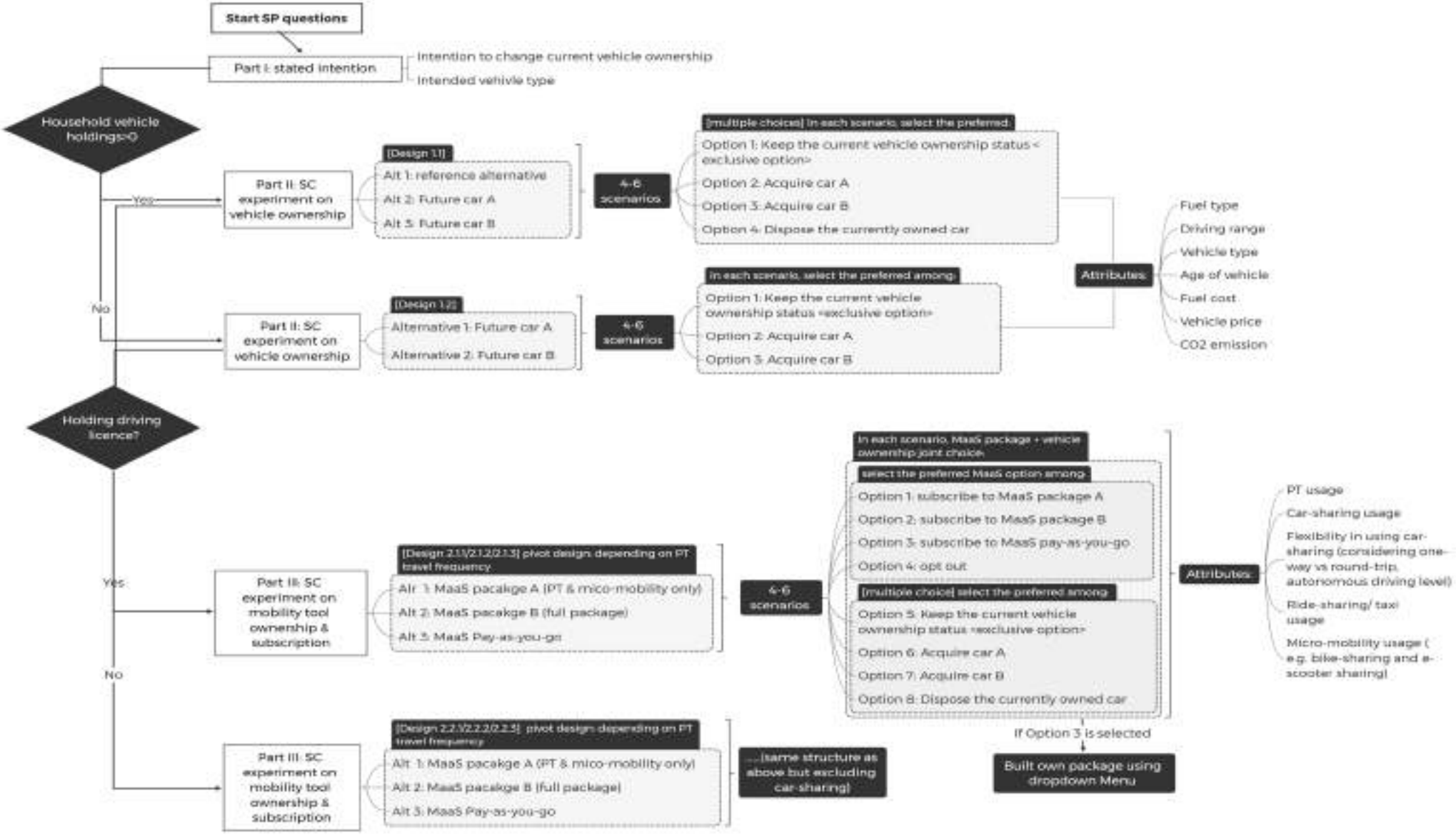

Figure 13: General framework of SP survey

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2.3.3.3. Part I: Stated intention

Survey participants will first be asked what they intend to do with their current vehicle ownership status. This provides information about people's current plan with respect to changing vehicle ownership status in the real world. For example, participants who own vehicles can indicate whether they are planning to:

- remain the current vehicle ownership status
- acquire a new vehicle while retaining the currently owned vehicle
- replace the currently owned vehicle with a new vehicle
- dispose the currently owned vehicle and not acquire any new vehicles

Moreover, those who have purchase plans will need to indicate what kind of vehicle (in terms of, for example, car body style, energy type) they intend to purchase or are interested in.

2.3.3.4. Part II & III: Stated choice (SC) experiments

Stated choice experiment is a useful SP approach to understand preferences and behaviour that are difficult to be observed in real world. In a typical SC experiment, a series of imaginary situations will be built up where survey participants need to select their most preferred option among several different options in each imaginary situation. That is, instead of directly asking respondents about their preferences, we will identify driving factors and interpret preferences through choices made in SC tasks. This data will be later examined through discrete choice models - a powerful toolbox of econometric analysis.

For the Oxfordshire and Turin demonstration, we plan to conduct two SC experiments on selected participants. Both experiments will be created through specialised design methods (such as orthogonal design, D-efficient design), each presenting participant with several hypothetical choice scenarios. In order to avoid heavy cognitive burden on respondents, we plan to incorporate 4-6 choice scenarios for each SC experiment and will keep the number of scenarios the same between experiments.

1) Stated choice (SC) experiment 1

The first SC experiment will focus on vehicle ownership decisions. Each scenario will be formed by two future cars together with - if a respondent owning any vehicle at the moment - a reference car alternative. Then respondents will need to indicate the actions they want to take in each scenario. For instance, respondents are at liberty to select more than one preferred action in each scenario, which may include:

- keep the current vehicle ownership status (exclusive option and should not be selected jointly with the remaining actions)
- acquire future car A
- acquire future car B
- dispose the currently owned car (excluded if the respondent does not own any vehicle in the household)

A set of attributes will be used to delineate each car alternative, for example fuel type, driving range, vehicle type, age of vehicle, fuel cost, purchase cost and selling cost. The values that each attribute take for a specific car option will vary across tasks, such that different scenarios are presented where people's choice behaviour will be recorded. The reference alternative, if included, will be profiled based on the characteristics of the vehicle currently owned by the household.

This experiment is expected to identify the determinants of vehicle ownership choices and evaluate people's sensitivities towards and trade-offs between these determinants. This SP data can also be jointly modelled with the RP data for vehicle ownership forecast. Besides, helpful insights can

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be drawn from this data in terms of understanding respondents' tendency in shifting towards new energy vehicles.

2) Stated choice (SC) experiment 2

After completing the first SC experiment, respondents will be faced with a second SC experiment, with emphasis on the decisions for mobility service subscription. This SC experiment is driven by the prospect that new mobility services can potentially substitute or complement a self-owned vehicle, especially in the presence of a well-round MaaS system. Hence, it is crucial to extend beyond conventional vehicle ownership and to explore people's preferences towards various mobility tools - including those traditional ones like private cars and public transport passes as well as those novel ones such as (autonomous) car-sharing, bike-sharing and air taxi (i.e., passenger unmanned aerial flying vehicles (UAVs)) in the upcoming new context.

The main idea of this SC experiment is to create a set of hypothetical scenarios where respondents in each scenario make choices among several pre-defined MaaS packages, pay-as-you-go MaaS service and private vehicles. It can be computationally burdensome to directly generate a single SC design with too many alternatives and attributes. Hence, we propose to combine two separate SC designs which is briefed as follows.

Specifically, a SC design on MaaS services (i.e., without car ownership options) will be generated, such that respondents can select their preferred MaaS services in each hypothetical scenario. As indicated in the figure, the MaaS SC scenarios can be created through pivot D-efficient design to frame the hypothetical choice scenarios around the actual travel frequencies revealed by the participant in the RP section. For example, for someone who barely uses PT, the PT component in MaaS packages would be kept at a low level. This would help in making the choice tasks relatively more realistic. The availability of a specific mode and the usage amount of each available mode in a MaaS package will vary across scenarios, making it possible for us to understand the preferences towards different modes provided by MaaS. Respondents can select among:

- subscribing to MaaS package A (which only covers public transport and micro-mobility)
- subscribing to MaaS package B (which is a full package including not only public transport and micro-mobility but also ride-sharing and car-sharing, though car-sharing needs to be excluded for those without valid driving licences)
- pay-as-you-go MaaS service (which is not pre-defined but requires respondents to build their own MaaS package if selected)
- opt out

Each MaaS choice scenario is paired with one of the hypothetical vehicle ownership scenarios that the respondent has seen in the first SC experiment. Respondents in this case will be required to make a joint decision based on all options on the table. For example, one can subscribe to MaaS package and dispose his/her currently owned vehicle in the meantime. By doing so, we will be able to see whether people's vehicle ownership choices are consistent between the first and second SC experiments or affected by the presence of MaaS services. This is expected to enable the examination on how people would make trade-offs between different types of mobility tools and the amount of usage of each mobility tool.

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2.3.4. Mode choice

2.3.4.1. Introduction

This section presents the stated choice experiments for mode choice, which focuses on including both traditional travel modes and innovative, novel transport modes and mobility services which may be available at future horizons in HARMONY study areas. Given that one of the main axes of HARMONY analysis, modelling and simulation focuses on providing potential demand for new mobility services and transport modes (such as MaaS and AVs) we choose to design experiments which include such modes. One of the advantages of SP experiments is that using SPs we are able to capture preferences and model demand for services and products not available at the market at present.

The mode choice SP experiment is dependent on specific RP data that will be derived from the MOBYapp and questionnaires presented to the respondent previously. More specifically, the SP experiment has the following prerequisites:

From RP data (MobyX activity diaries) we extrude for each individual:

- Main activities detected [Work, School, Leisure, Care, Shopping, etc.)
- Average distance per main activity [kms]
- Average travel time per main activity [mins]

These variables are prerequisites in the sense that levels, choice set, and specific data flow of the experiment are dependent on them. For example, we present tasks to each respondent based on the main activity (Work, School, etc.) they indicate.

2.3.4.2. Survey design

The mode choice SP experiment will be presented to the respondents after we have obtained access to specific RP variables. The first page is an introductory page where two main section are presented: Information about new travel modes and mobility services and a description of the levels of automation for the purposes of coherent identification of AVs capabilities and restrictions. The information paragraphs about the new modes are presented in the constructed survey link (accompanying the deliverable) and the levels of automation will be presented in a way similar to Figure 14 (SAE automation levels). It should be noted that our experiment contains levels 3 to 5 in order to explore demand for advanced AVs, given that we are investigating a future horizon with advanced-level AVs available.

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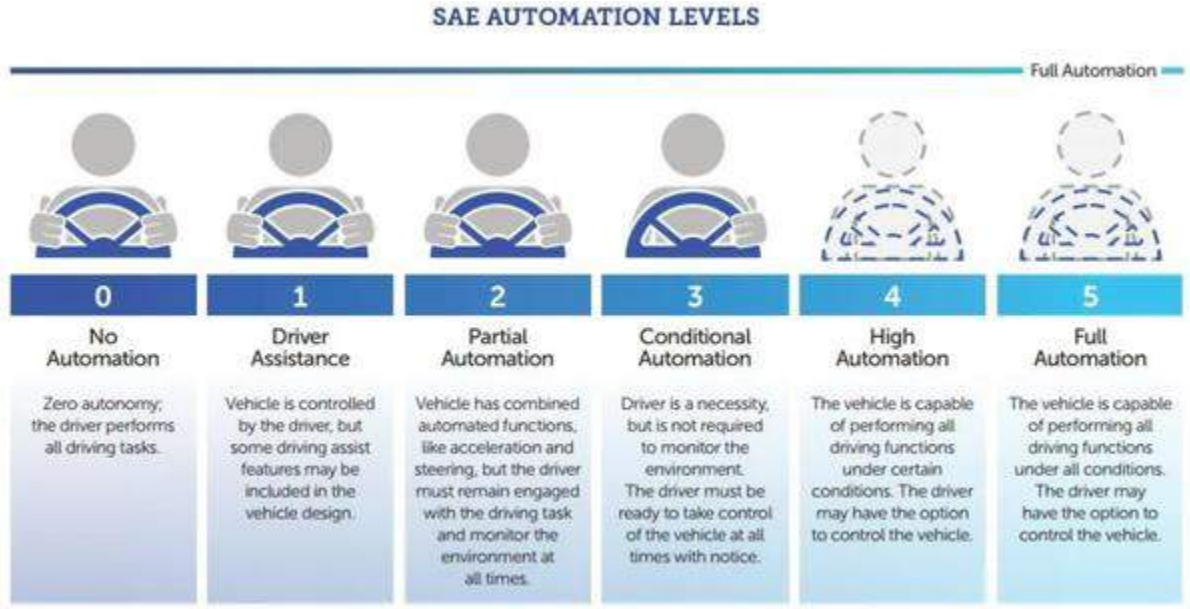

Figure 14: SAE Automation Levels, Source: NHTSA, Automated Driving Systems 2.0: A Vision for Safety

After the introductory page the survey design proceeds with a backend calculation of specific RP provided variables in order to generate respondent specific SPs. The main generation process parameters are presented below:

1. One or two tasks per main activity (total of 6-8 tasks)
2. Call from the database (RP data) the following key variables for each respondent:
    a. average distance (*Distance*) and
    b. average travel time (*BasePrice*)
3. Set the average travel time as base value for attribute levels
4. Set the average distance as base value (1 € / 15kms) for travel cost (*DistanceBasedPrice*)
5. Pace bike= 15km/h
6. Pace walk= 5km/h

After the key variable generation process, we proceed with the following SP design (Table 4). The SP design is orthogonal (without dominant alternatives).

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Table 4: Mode choice stated preference experiment

	Shared Vehicle	Private Vehicle	Bike	Walking	PT	Ride-hailing
Travel time (in vehicle)	Base price x (0.5-1.5)	Base price x (0.5-1.5)	Distance*PaceBike x (0.7-1.2)	Distance*PaceWalk (0.7-1.2) (always larger than TT of motorized)	Base price x (0.5-1.5)	Base price x (0.5-1.5)
Waiting time / parking time	0 minutes;5 minutes;10 minutes; more than 10 minutes	0 minutes;5 minutes;10 minutes; more than 10 minutes	0	0	0 minutes;5 minutes;10 minutes; more than 10 minutes	0 minutes;5 minutes;10 minutes; more than 10 minutes
Travel cost (per trip)	DistanceBasedBasePrice x (0.5-.1.5)	DistanceBasedBasePrice x (0.5-.1.5)	0€	0€	DistanceBasedBasePrice x (0.5-.1.5)	DistanceBasedBasePrice x (0.5-.1.5)
Self-driving capability	Level 3; Level 4; Level 5	Level 3; Level 4; Level 5	-	-	Level 3; Level 4; Level 5	Level 3; Level 4; Level 5
Environmental impact[3]	1;2 or 3 trees	1 or 2 trees	4 trees	4 trees	1;2 or 3 trees	1;2 or 3 trees
Unknown co travellers	Yes	No	No	No	Yes	Yes

[3] Signifies environmental impact in the following way: 1 tree least sustainable - more emissions (could include petrol and diesel cars or low occupancy; 2 trees less sustainable (electric or hybrid private cars with higher occupancy or traditional PT or shared modes); 3 trees more sustainable motorized modes (modern electric PT vehicles with higher occupancy) and 4 no emission modes: walking and cycling

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Co-travellers [4]	0;1;2;3;4;5+ [to be shown graphically]	-	-	-	Empty, 50%, crowded [to be shown graphically]	1;2;3;4 [to be shown graphically]
Type of service	shuttle bus; car-sharing				Metro; bus; tram	Taxi; uber; flying

A special case for the mode choice experiment includes respondents who have stated in the mobility tool ownership SP that they would purchase a MaaS plan of any kind.
In these cases, the mode choice SP is adjusted to include a section of multimodal options as per the Figure 15 below:

Your purchased MaaS plan:
- 1 month of PT
- 5 RH trips
- 3 hours of car-sharing
- 1 month of bike-sharing access

Total cost of plan: 150€

Consider a trip from [Home] to [PA], where you may use any mode or combination of modes from your MaaS plan

Please select (or rank) from the list below:

1. PT: 50 minutes
2. RH: 40 minutes
3. CS: 45 minutes
4. BS: 120 minutes
5. PT+RH: 45 minutes
6. PT+CS: 40 minutes
7. PT+BS: 70 minutes
8. PT+CS+BS: 60 minutes
9. CS+BS: 70 minutes
10. RH+BS: 70 minutes
11. None of the above

The selected mobility service unit will be removed from your MaaS plan after the trip

..

Given the above choice what would be your desired departure time : __:__

Figure 15: Section of multimodal options from Mode Choice SP

Combination of modes is generated based on the available mobility services that are purchased in the plan, as stated in the mobility tool ownership SP. In the case that respondent vary between respondents and no consistent plan is clearly selected the SP will present the most popular plan. Travel times are indicative and will be pivoted based on travel times received in the RP section (by MOBYapp tracking).

[4]

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Additionally, one of the two SP tasks includes information regarding the available budget of mobility services and the hypothetical time from plan purchase as per the Figure 16 below:

Your purchased MaaS plan:
- 1 month of PT
- 5 RH trips
- 3 hours of car-sharing
- 1 month of bike-sharing access

Total cost of plan: 150€

Current availability of services:
- 1 month of PT
- 2 RH trips
- 1 hours of car-sharing
- 1 month of bike-sharing access
- *4 days left in the plan duration*

Consider a trip from [Home] to [PA], where you may use any mode or combination of modes from your MaaS plan

Please select (or rank) from the list below:

1. PT: 50 minutes
2. RH: 40 minutes
3. CS: 45 minutes
4. BS: 120 minutes
5. PT+RH: 45 minutes
6. PT+CS: 40 minutes
7. PT+BS: 70 minutes
8. PT+CS+BS: 60 minutes
9. CS+BS: 70 minutes
10. RH+BS: 70 minutes
11. None of the above

The selected mobility service unit will be removed from your MaaS plan after the trip

..

Given the above choice what would be your desired departure time : __:__

Figure 16: SP regarding the available budget of mobility services and the hypothetical time from plan purchase

The second task focuses on exploring the decision-making process regarding the multimodal option and the choice of combinations of available services in the context of available budget to understand the effect of service availability in the mode choice process of agents subscribing to a MaaS plan. This is an important behavioural aspect which may lead to alternative specifications of the scheduler system in the tactical level, especially if we decide to explore day-to-day variations in the monthly setting: an agent may behave differently when the available "budget" of mobility services purchased is running out or avoid a specific mode if the running plan has run out of such services (e.g., an agent may not choose a ride hailing trip after she runs out of such trips).

To provide context into the modelling phase of mode choice, Figure 17 presents the overall logic flow between the different models regarding the agent's choice of MaaS plan in the long-term decision context (as indicated in the mobility tool ownership SP & model).

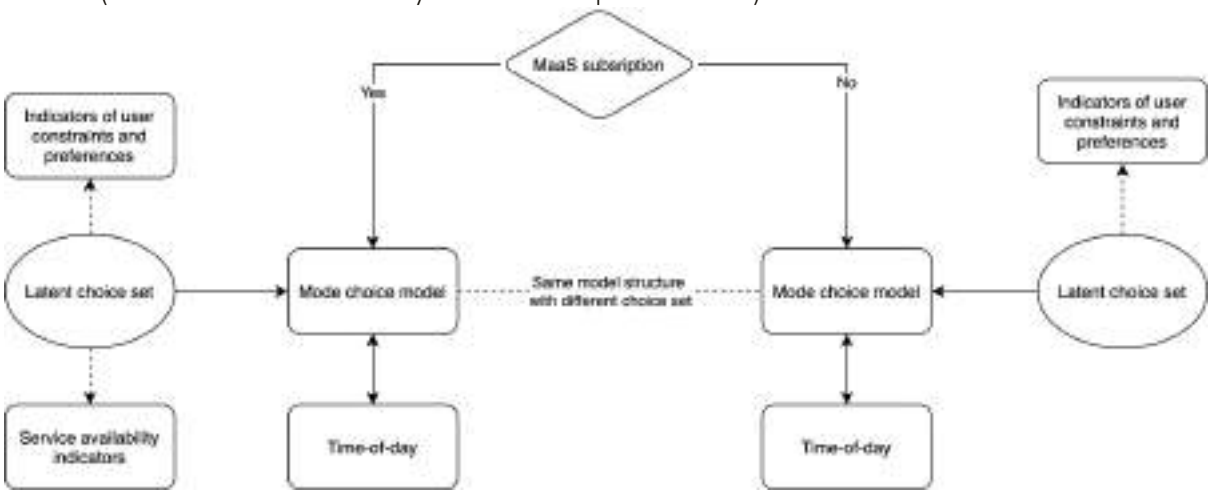

Figure 17: Overall logic flow between the different models

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2.3.5. Dynamic demand shift

2.3.5.1. Background and motivation

The system conditions of transportation are dynamic by nature, leading to continuous changes in travel behaviour and mobility needs. People's decisions are affected both by exogenous variable changes, as well as state-dependence and shifts in their sensitivity to attributes over time. Within the HARMONY MS, the within-day re-evaluation module aims to model the inherent dynamics of within-day choices due to scheduling restrictions imposed by unforeseen events and exogenous variables. (short-term). The day-to-day learning module captures the day-to-day evolution of the agent plans based on the feedback provided from the supply simulator. (long-term). Research on such dynamics and travel behaviour change is fairly limited and this is logical considering the data requirements. Panel data are in most cases necessary, which are difficult and costly to collect. (Timmermans et. al., 2014).

A web-based stated adaptation experiment was selected as the appropriate approach for collecting the data required to develop the dynamic demand shift models. Stated adaptation experiments are defined as a class of experiments in which respondents indicate their responses to a hypothetical scenario, expressing the likelihood of behavioural change (Bellemans et al., 2009). Therefore, the interest is on reactive behaviour and probability of adaptation over specific conditions or constraints. This data collection method was efficiently applied in the development of ALBATROSS to predict adjustment strategies in response to pricing scenarios (Arentze et al., 2004).

2.3.5.2. Experiment scope and structure

In the presence of live information (e.g., smartphones, radio), we often adapt our habitual schedule to account for delays within the network, as a result of disruptive events (congestion, roadworks, weather conditions etc.). The scope of the stated adaptation experiment is to understand travellers' re-evaluation preferences and how previous experience affects long-term perceptions on future travel times. The sociodemographic characteristics are first collected in the RP section of the survey for all participants. In the landing page, the participants are then informed about the experiment structure as follows,

'You will be presented with a series of hypothetical days with variating travel times for 2 core activities of your habitual schedule. You will then be asked to re-evaluate your original choices in different situations. In the first set of scenarios, live information will be provided during your previous activity. In the second set, this information will be acquired while you have just started your trip en-route. Consider how you would realistically react in each case. Please keep in mind the following points for your responses:

1. Variation in travel times is random and does not follow a specific pattern.
2. The following hypothetical scenarios happen in consecutive days. If this is not a daily activity, assume consecutive occurrences of your planned activity.
3. Live information refers to any source of information about the expected travel time for your trip on the specific day. (e.g., journey planner, radio etc.)

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2.3.5.3. Travel diary tracking

An important challenge in the design of stated adaptation experiments is the realism of the hypothetical scenarios. In our case, to increase task realism the selected trips will be defined through a revealed preference (RP) setting. In the metropolitan areas of Oxfordshire and Turin, the MOBYapp smartphone-based travel survey tool will capture the habitual travel patterns of the participants in the form of travel diaries, using activity (GPS) tracking. In addition, available open APIs will be linked to the backend of the system to improve the capabilities and visualization of the SP experiment, further increasing the realism of the hypothetical scenarios. Due to the size and complexity of the dynamic demand shift SP experiment, it will not be embedded within the app, but participants will be provided with a link and redirected to the web page.

2.3.5.4. Trip mutation algorithm

The participants will be presented with scenarios based on the tracked activity diaries. Two trips of different activity type (e.g., work, shopping, leisure) will be selected from the trip mutation algorithm (Figure 18). The algorithm is defined by a set of heuristic rules, prioritizing high-importance trips with less flexible time windows (work, school), that are more likely to be adapted. Each scenario will be presented for 6 hypothetical consecutive days with variating travel times. In the first set of scenarios (6 days), the re-evaluation decision will be taken prior to the execution of the trip, in presence of live information. In the second scenario, the re-evaluation process will be considered while en-route to the next activity.

Trip Mutation Algorithm	
	Identify trips with **2 or more** occurrences in the tracked activity of the participant.
Trip 1	1.1 If the individual is employed, select the longest commuting trip (work).
	1.2 If the individual is a student, select the longest education trip.
	1.3 If the individual is unemployed, select the longest shopping or leisure trip.
Trip 2	2.1 If there are children within the household, select the longest accompanying trip (e.g. school).
	2.2 Else, select the longest present shopping or leisure trip, that was not selected under 1.3.
	2.3 Else, select the longest from the remaining tracked trips.

Figure 18: Trip mutation algorithm for selection of trips from the travel diary (RP)

2.3.5.5. Part A: Within-day re-evaluation

This section aims to capture within-day event-driven re-evaluation to account for a range of events that might cause travel time fluctuations such as road closure, congestion, weather, accidents etc. The daily scenario is presented to the participant as follows,

Imagine that travel time fluctuations are expected in the upcoming period in your area. Your habitual trip from activity {A} to activity {B} with mode {M}, will likely be affected. Today, prior to departure from activity {A} / en-route to activity {B}, you acquire live information for an expected delay of X minutes in your upcoming trip. What would you do in this situation?

Weis and Axhausen (2012) have also studied the effect of travel time variation on within-day choices, capturing the effect on the overall schedule, rather than trip-specific adaptation, which is the

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scope of this experiment. Within HARMONY, a hierarchical process is envisioned that takes into account the following re-evaluation strategies, i) activity rescheduling (e.g., cancellation or addition of an activity) ii) change of departure time iii) mode shift iv) change of route. Figure 19 presents an overview of the hierarchical structure. The questions are based on a simple multiple-choice format to make it understandable for all participants. The alternative modes will be defined by the mode choice experiment implemented in OXS and TUR respectively.

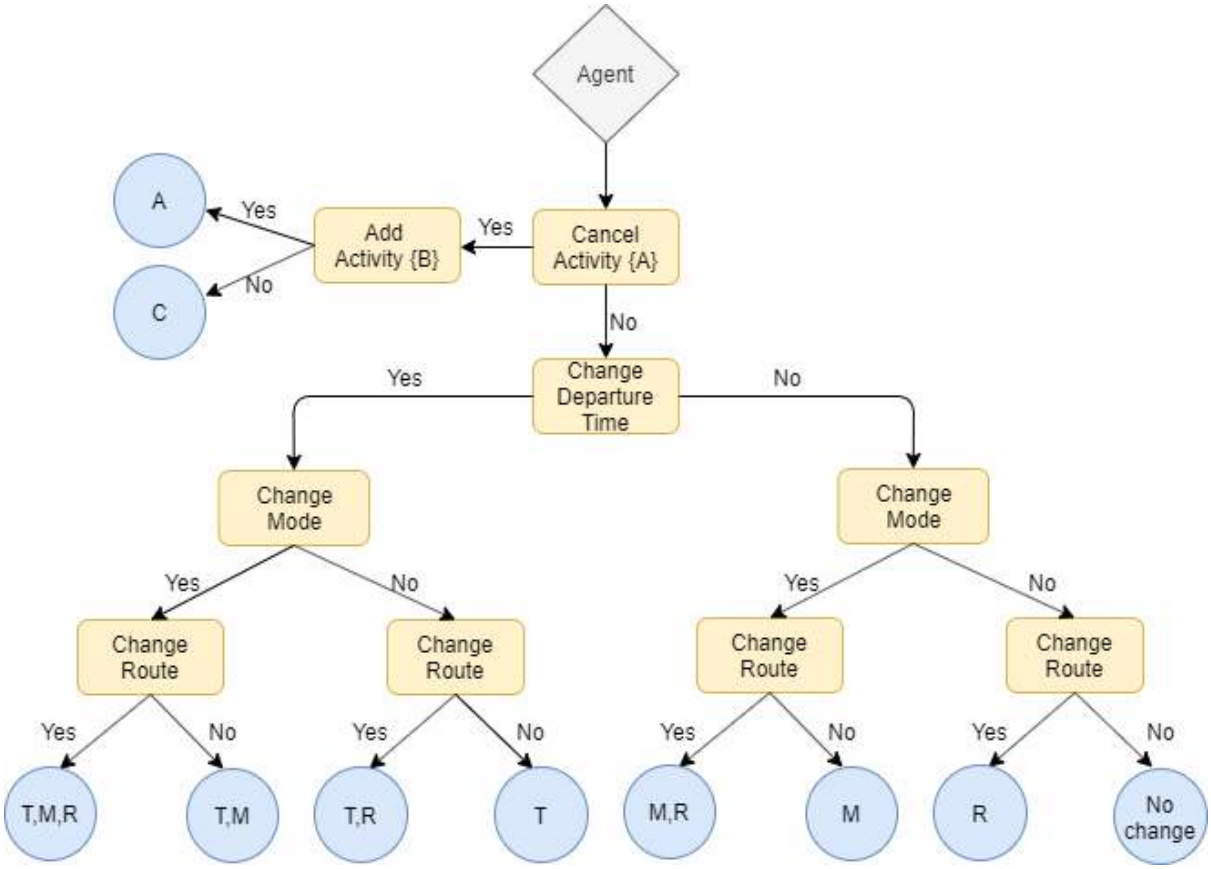

Figure 19: Within-day re-evaluation SP hierarchy

2.3.5.6. Part B: Day-to-day learning

At the end of each hypothetical day, the participant responds on his updated travel time perception, as a result of the fluctuations over the past days. There are 6 different travel time variations (0.5x, 1x, 1.5x, 2.0x, 2.5x, 3.0x) presented to the participant, calculated from the average expected travel time of the specific trip (RP section). The repetitive scenarios mimic the feeling of stress and capture the emergence of adaptation strategies and perception updates (Psarra et al., 2016). The two main questions of the day-to-day learning section are,

i) Based on the past day(s), how long do you expect your trip to be today?'
ii) Would you consider a long-term adjustment of your schedule?'

These questions are targeted towards capturing the interpersonal and intertemporal heterogeneity which is prominent in many aspects of the day-to-day learning process. For example,

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some participants are expected to update their perceptions more frequently than others that integrate information rarely.

Furthermore, taking into consideration ordering effects is crucial for the efficient design of this day-to-day learning experiment. For instance, extreme values might influence future decisions more if presented in the first days of the experiment, rather than the latter ones. In order to investigate this effect -while considering sample size limitations-1 out of 6 possible orders is assigned randomly to each participant. These orders are based on the derangement of an initial sequence, which is a permutation of the 6 elements (time variations), such that none appears in the same position (day) twice. Thus, all travel time fluctuations (e.g., extreme delays, early arrivals) are distributed evenly over the sample and time horizon of the experiment.

All the SPs can be found on Appendix 16.

2.4. Sampling strategy and methodology

2.4.1. Sampling Methodology

In the past decade, there are great advancements in the state of the art in travel behaviour research like the stronger conceptualization of activity-based approaches to travel demand forecasting (Bowman and Ben-Akiva, 2001; Goulias et al, 2011, Polydoropoulou et al., 2013). This advancement provides a theoretical framework of everyday life of the residents and includes theoretical strengths such as the use of an activity agenda to connect individuals' trips having a strong correlation between the choices made for each trip with the choices for other trips, a person's daily agenda is function of other persons' daily agendas, and all these daily agendas take place in dynamically changing environment that affects the trip choices (Polydoropoulou et al., 2013). Therefore, advanced data collection methods are needed (Goulias et al., 2013). Specifically, the development in technology and data fusion enable close communication to the respondents in surveys, the decrease respondent burden, and the increase the amount and quality of information (Polydoropoulou et al., 2013). Also, observations of residents in large metropolitan areas with focus on their daily life showed that the data from revealed preference (RP) data and stated preference (SP) can be used to enrich behavioural models and their simulation allows the representation of activity agendas at the level of longitude and latitude (Polydoropoulou et al., 2013). Thus, policy questions can be answered with great flexibility.

Figure 20 are presenting an overall scheme and components of the survey design. Key innovations regarding this survey are: a) a satellite design to collect more in-depth data about user's daily activity which is extending to one week; b) the incorporation with dynamic SPs to capture the travel behaviour of the users; and c) a set of complementary survey components that provide data for more detailed behavioural models and verification and validation.

At the very centre of Figure 20 is the MOBYapp that collects a selection of information about the socio-economic characteristics and a seven-day activity participation to track the travel behaviour of the participants. The sample is stratified at a transport zone level to ensure that sufficient segments of the population are represented. Also, for this reason a strategy for minimum number of households (with 0, 1, 2 etc. number of cars) within the study area is needed for the model development that requires spatial detail.

The data elements required are socio-economic characteristics (age, gender, education, employment, income, driver's license, marital status), household composition and vehicle data, travel behaviour information and attitudes and perceptions regarding automated vehicles, COVID-19 and data privacy concerns. The base seven-day activity-travel diary includes a complete record of each person's daily

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schedules including all locations visited, activities engaged, and all trips made. Also, it records with whom each activity and trip were made, and activities carried out at home and at other places.

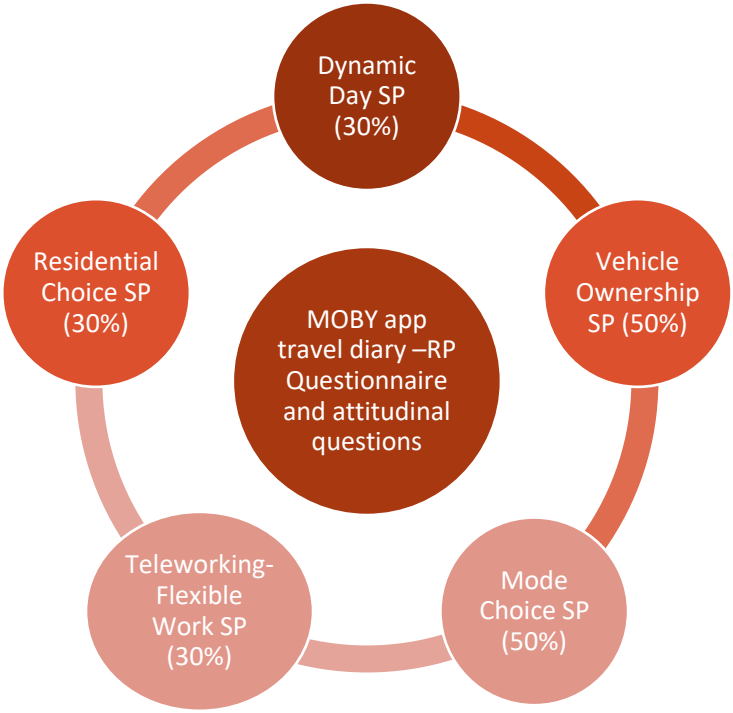

Figure 20: Data Collection Overall Scheme

Every two days, based on the satellite structure and preliminary distribution, a proportion of the pilot participants will be asked to complete a Stated Preference scenario concerning any of the following SPs: Residential Location Choice, Teleworking-Flexible Work, Vehicle Ownership, Mode Choice and Dynamic Demand. The sample proportion that will participate in each satellite survey is depicted in Figure 20; however, these proportions will be re-visited before the start of the pilots.

Residential Choice SP: To explore future residential locations, re-location and dwelling type changes, an SP that accompanies the remote work SP has been developed; given that recent studies correlate the work setting and the residential location choice. The residential location SP is presented to the same users responding to the remote work SP in a sequential way More details about Residential Choice SP can be found in Section 2.3.1.

Teleworking/Flexible Work SP: We focus on exploring the factors affecting the choice (and the extent to which this is an actual choice) to work or study remotely for two main reasons: The first one has to do with the remote work trend being especially relevant in the COVID-19 era to the extent that it is included frequently as an active response measure (usually as a percentage of workers or horizontally for education) and is likely to remain as an option for future scenarios regardless of the pandemic's course. The second reason has to do with the lack of census data capturing this drastic, recent change in remote work percentages and patterns. The lack of such data will affect the synthetic population aggregate totals and will not result in an accurate prediction of the BAU scenario. For more details about Teleworking/Flexible Work SP see Section 2.3.2.

Vehicle ownership SP: Stated preference (SP) survey that will be made up of three parts: stated intention questions, stated choice experiment 1, and stated choice experiment 2. First, the participants will provide information regarding their current plan about the car ownership and what they intend to

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do in the future. The first SC experiment will focus on vehicle ownership decisions. This experiment is expected to identify the determinants of vehicle ownership choices and evaluate people's sensitivities towards and trade-offs between these determinants. The second SC experiment will emphasize the decisions for mobility service subscription. The prospect drives this experiment that new mobility services can potentially substitute or complement a self-owned vehicle, especially in the presence of a well-round MaaS system. More details about Vehicle ownership SP can be found in Section 2.3.3.

Mode Choice SP: One-week activity and travel diary. Approximately 50% of the survey households will be recruited to participate in an entire week diary and to complete the mode choice stated preference. This SP will enable the creation of models that account for day-to-day variation in activity scheduling and can capture preferences and demand for services and products that are not available at the market at present. For more information about the Mode Choice SP see Section 2.3.4.

Dynamic Day SP: Day-to-day learning module that captures the day-to-day evolution of the agent plans based on the feedback provided from the supply simulator. The scope of the stated adaptation experiment is to understand travellers' re-evaluation preferences and how previous experience affects long-term perceptions on future travel times. More details about Dynamic Day SP can be found in Section 2.3.5.

2.4.2. Sampling Strategy

The sampling strategy that will be followed for the passenger surveys in Turin and Oxfordshire is stratified. In stratified sampling, the population is divided into subgroups, and a random sample is taken from each group, thus ensuring representativeness of the population of interest (every stratum is adequately represented (Ackoff, 1953; Hamed Taherdoost, 2016).

The optimal sample size was determined based on census data acquired for each pilot city. More specifically, the key variable that was used from census data to determine the sample was car ownership. The most critical factors for the determination of the required sample size[5] and the estimation of the population parameters are:

1. The variability, over the population, in the parameters to be measured and
2. The degree of precision required for each of the parameter estimates.

The methodology applied for calculating the sample size uses the Central Limit Theorem by applying it to the proportion of a sample possessing a certain characteristic, in our case owning a car (Richardson, Ampt & Meyburg, 1995). The standard error ($s.e.$) for the estimation of proportion p is given by:

$$s.e.(p) = \sqrt{\frac{N-n}{N} \times \frac{p \times (1-p)}{n}}$$

N: Population size of the area
n: Sample size
p: Population proportion

[5] For the determination of the required sample size, we used the Central Limit Theorem. This theorem states that estimates of the mean of the sample tend to become normally distributed as the sample size "n" increases. This normality of the sample means applies irrespective of the distribution of the population from which the samples are drawn provided that the sample size is of reasonable size (n>30). For small sample sizes, the theorem still applies provided that the original population distribution is approximately bell-shaped. (Anthony J. Richardson, 1995).

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The required sample size is obtained in a two-step calculation by:

$$n' = \frac{p \times (1-p)}{s.e.(p)^2}$$

n': finite correction factor

Applying the finite population correction factor, the final required sample size is given by:

$$n = \frac{n'}{1 + (n'/N)}$$

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3. Survey tools for Turin

3.1. Passenger travel demand survey

The objective of HARMONY for Turin is to apply the Strategic and Tactical simulators of the HARMONY Model Suite. A Passenger travel survey will take place in the metropolitan area of Turin. This survey will consist of:

- Household questionnaire (Revealed preference; RP)
- Individual questionnaire (RP) with SPs-based on the satellite about:
  - Mobility tool ownership and usage,
  - Residential location choice,
  - Teleworking / Flexible working,
  - Mode choice, and
  - Dynamic travel planning within the day
- Activity diary (RP) (the input will be through MOBYapp)

This Section is described in detail in Section 2.2, all the tools that have been developed for this survey in Section 2.3 and the questionnaire can be found in Appendix 1.

3.2. Sampling strategy for Turin's passenger survey

The sampling strategy as presented in section 2.4.2 is stratified. The parameter used for the sampling design was car ownership. By taking into consideration the total population of the study area and the budgetary constraints, the required number of participants in Turin should be between 1824 - 2010 in order to have 86% - 87% of confidence level (Table 5)

Confidence level	Required individuals	Sample for No cars or vans in household	Sample for 1 car or van in household	Sample for 2 cars or vans in household
86%	1824	453 individuals	864 individuals	506 individuals
87%	2010	499 individuals	953 individuals	558 individuals

Table 5: Sampling strategy for Turin residents survey

In addition, to ensure representativeness of the population the total sample should meet the below proportions:

- Gender: 50% males, 50% females. In some areas (traffic zones) where different gender distribution has been observed (based on the census data), different proportions are provided.
- Employment Status: 47.4% of them should be employed, 4.8% should be unemployed and looking for job, 28.1 should be retired, 6.3 should be students and the rest 13.4% should be not working force.

The sampling strategy for the Passenger travel survey in Turin is presented in detail in Appendix 3. All surveys for Turin are presented in Figure 21.

Passenger Travel Demand Surveys

- Household questionnaire (Revealed preference; RP) (Section 2.2 & Appendix 1)
- Individual questionnaire (RP) with SPs (Section 2.3) about:
  i. Mobility tool ownership and usage,
  ii. Mode choice, and
  iii. Dynamic travel planning within the day
- Activity diary (RP) (Section 2.1)

Figure 21: Designed Surveys for Pilot City: Turin

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4. Survey tools for Rotterdam

4.1. Introduction

The tactical freight simulator already contains a first representation of the logistical decisions of the various actors (de Bok et al., 2018). Most of these empirical models are based on available truck diaries data that is collected by Statistics Netherlands. However, there are still data missing that would ensure the accurate modelling of logistics agents' preferences and the evaluation of the logistic use cases in HARMONY.

In general, what is missing for the development of the tactical freight simulator is data on the preferences, or willingness-to-pay, of different stakeholders in the urban freight distributions, such as carriers, LSPs or retailers. Therefore, GROT will aim to collect the following data:

1. Choice data of different stakeholders (shippers, carriers, shopkeepers) in the use of urban consolidation centres and new last-mile solutions such as autonomous vehicles or cargo bikes.
2. Choice data on the use of new services or technologies, such as autonomous logistic services, cargo bikes
3. Choice data on the response of stakeholders to specific subsidy schemes, such as for zero emissions vehicles, LSPs and carriers.
4. Preference of companies for the configuration of different zero emissions zones from carriers, LSPs and retailers.

4.2. Freight survey design for Rotterdam

4.2.1. Data collection

In accordance with the Paris Climate Agreement the city of Rotterdam (GROT) set a clear objective to reduce all the greenhouse gas emissions by 49% in 2030 and by 95% by 2050. This goal shapes the long- and short-term mobility plans of the Rotterdam City Council and is the basis behind the development of a Roadmap for Zero Emissions City Logistics (ZECL). Specifically, the ZECL is developed around the "Trias Mobilica", the following three pillars: Cut back, Change and Clean up motorized transport. Firstly, Rotterdam will make efforts to eliminate all unnecessary kilometres by stimulating consolidation, e.g., by means of centres to bundle freight outside the city centre. The freight bundling will be followed by a modal shift to zero emissions vehicles such as electric/ autonomous vans and cargo bikes. The third pilar refers to "cleaning up" the existing vehicles and use technologies to turn them into zero emissions vehicles. Already in 2014, in cooperation with several logistics providers and the Netherlands Organisation for Applied Scientific Research (TNO), Rotterdam signed the Green Deal 010 for Zero Emissions City Logistics (GD010ZECL) setting the ambitious goal to make all logistics in the city centre emission-free by 2020. Although the front-running partners have made good progress, this ambition turned out to be unachievable. GROT is currently challenged to design a concrete framework in combination with the adoption of effective policies to ensure the development of a Zero Emissions Zone for city logistics where transport movements will be kept into low levels and will be carried out by zero emissions vehicles. (City of Rotterdam, 2019). Thus, GROT faces the challenge to design an efficient ZEZ.

In the context of HARMONY, the Tactical Freight Simulator -TFS (HARMONY, 2020) can be applied in order to test effect of the various policies aimed at making freight transport in the city more efficient and emission free. Although the TSF contains a first representation of the logistical decisions of the various actors (de Bok et al., 2018), there are still data missing that would ensure the accurate modelling of logistics agents' preferences.
Therefore, the aim of the Rotterdam data collection is twofold:

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1. To **ensure the efficient design** and **transition** to **Zero Emissions Zone (ZEZ).** Data collection will focus on identifying the preferences of stakeholders that can later be used to increase their acceptance of specific policies. In addition, stakeholder data will be applied to design effective transition paths for each logistics segment[6].
2. **Improve the support of the actors for the policy measures,** by analysing and evaluating them with a simulation tool (the TFS) that reliably represents their operational process. The analysis and evaluation are intended to incorporate preferences of the actors as much as possible.

To achieve the above goals GROT in collaboration with TUD, follows two different approaches: 1) the development of a simulation game; 2) questionnaire based stated preference surveys.

4.2.2. The Rotterdam HARMONY Game

Simulation Games (SG) are representations of real-world complex systems that take into account the complex relationships created between stakeholders (Lukosch et al., 2018, Lukosch et al., 2016). Games allow researchers get deep insights into existing systems, enabling players to deploy new collaboration mechanisms and to experiment with new business models. They can also serve as behavioural data collection tools that enables the observation of the interactions created between the players. SGs have already been proven as valid research tools for complex transport systems (Kourounioti et al., 2018; Kurapati et al., 2017).

In the context of HARMONY, we develop a multiplayer SG where all stakeholder groups engaged in the Rotterdam urban freight environment are represented. The HARMONY Rotterdam game, via the interaction between the players, provides GROT with the opportunity to design an effective ZEZ accepted by the stakeholders. In addition, GROT can experiment with various transition scenarios for each logistics segment. Via the game play stakeholders will be able to experiment with different transition to zero emission zones scenarios, have more degrees of freedom to interact and agree on the optimal zero emissions zone configurations and express their preferences on the deployment paths of zero emissions vehicles (electric/ autonomous vans, cargo bikes etc.) and the location of the consolidation centers.

4.2.2.1. *Game Design process*

The Rotterdam game follows a participatory approach in collaboration with city logistics stakeholders from city of Rotterdam in order to develop a valid, meaningful game experience. During the game design brainstorm session are organized with the employees of GROT and other engaged stakeholders to set the requirements for the game. Designing a SG is not a trivial task because it has to represent real world systems and needs to balance the trade-offs between accuracy, simplicity and generalization. We will apply the Triadic Game Design (TGD) (Hartverld, 2011) that ensures the balance between the following three components (triangle in Figure 22).

- **Reality**. This component describes how a game connects to reality. Actors, organizations, variables and their relationships much be incorporated in the game in such a way that represents reality.
- **Meaning.** This component defines the purpose of the game and ensures that the intended aim and value of the game are achieved.
- **Play.** The play component of the TGD will guide game development to ensure that players remain engaged and have a good experience during game play.

[6] For more information on the logistics segments please refer to D6.1 : The HARMONY Shipment Synthesizer module – Initial Version

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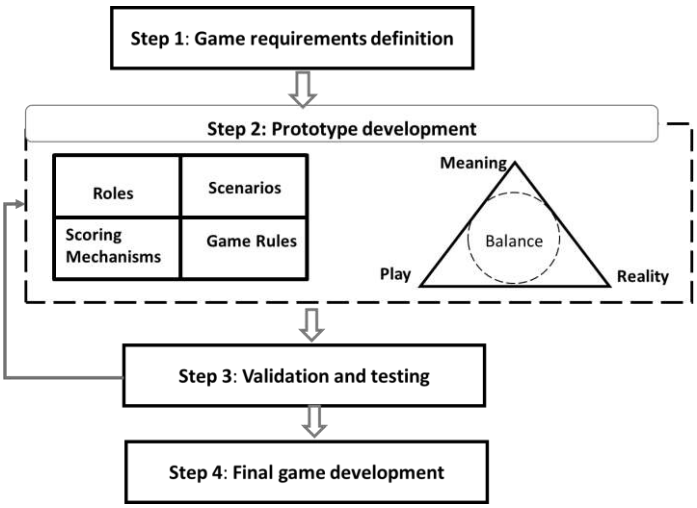

Figure 22: Rotterdam Game design framework adjusted from Kurapati, 2017

Game design follows an iterative and balanced approach. Specifically, the steps followed for game developed are summarized below (Figure 22):

i. Step 1 - Development of game requirements. In the first stages the game requirements are defined through workshop (s) with the GROT employees.
ii. Step 2 - Prototype development. After the set of requirements, the first game prototype is designed around the four pillars below:
    - Roles: All engaged stakeholders are represented via play roles in the game.
    - Scenarios: Different scenarios will ensure that all the necessary data are collected and that the effect of various policies and transition mechanisms are captured. The different scenarios will be represented in the game narrative and rules.
    - Scoring mechanisms. The scoring mechanism records the decisions taken by the players and their consequences during the game play.
    - Game rules. Game rules reflect the definition of the roles and the operating procedures of the scenarios and the accounting system.
iii. Step 3 - Test and validation. We test the prototype design with students inside TU Delft and with some participants from GROT. We incorporate comments, test the game balance and finalize the prototype.
iv. Step 4 - Final prototype. In this step the final prototype of the game is developed and can be played with logistics representatives of the city.

4.2.2.2. *Game prototype development*

The Rotterdam SG is a tabletop multi-player game that permits the interaction and collaboration between the players. The board will represent the map of Rotterdam city center (Figure 23).

The facilitator steers the gaming with a dynamic storytelling, making the game react to the decisions of the players in a fun manner. The main objective of the game is to assure that orders are delivered to business with optimal efficiency and zero emissions. The decision making of the players who assume the roles of business (for each logistics segment represented in the game) and carriers is studied.

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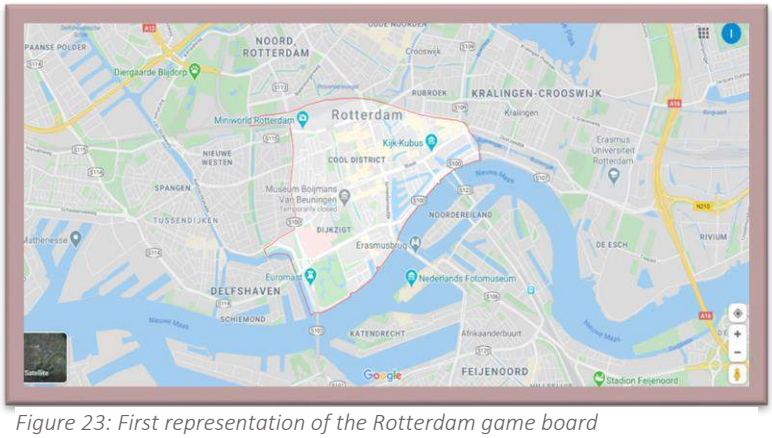

Figure 23: First representation of the Rotterdam game board

Roles

The key roles in the Rotterdam game are:

1. Businesses that operates in the area of Rotterdam, who decide the amount of shipments and delivery time and locations. Businesses will belong to one of the following logistics segments (horeca-fresh, horeca- non fresh, parcel and retail). Depending on the logistics segment each business will have a different requirement.
2. Carriers are assigned the shipments and are responsible for deliveries and consolidating the freight. They are also required to make investments in new vehicles, modifications of their old ones or to collaborate in order to meet the demand. The environmental version
3. The game facilitator. He/she will set the rules (implement policies) for different configurations of the zero emissions zones, impose monetary penalties and time or accessibility restrictions.

The number of players per session should be at least 4 because players can take multiple roles.

Scenarios

The game consists of two key scenarios. The first scenarios deal with the design of the ZEZ where the facilitator imposes different policies in terms of routes, size, vehicle types permitted in the zone and accessibility windows. In each round the location and the number of consolidations centers is modified. Carriers have to update their fleets in order to be able to access the zone.

The second scenario deals with future trends such as horizontal cooperation via capacity and assets sharing and changes in demand.

Operating procedures and accounting system

The game starts in a "business as usual" situation. Business that receiver shipments, are given cards with shipments and they have to assign them to the carriers who have a predefined capacity. With each round the facilitator imposes stricter policies and players need to adjust their strategies. Businesses need to get their shipments on time with the minimum cost and reduced emissions. Carriers should get as many shipments as possible and possible and at the same time comply with the regulations. Between rounds carriers are asked to invest into new vehicles to increase their capacity. Carriers gain points by reducing their costs and increasing the customer satisfaction (deliver all shipments on time). In addition, the load factor of trucks is an extra mechanism in the game. In general, companies are scored based on their cost and environmental performance. The facilitator can assign an efficiency bonus to both businesses and carriers for increasing load factors either by horizontal

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collaboration (between business and carriers) but also by vertical collaboration (i.e businesses agree to change delivery time windows).

4.2.2.3. *Briefing and debriefing*

The game is part of the workshop which starts with a briefing presentation by the facilitator of the scope of the aim of the game. Participants fill out a pregame questionnaire that collects their demographic characteristics, their expectation from the workshop and their current attitudes towards ZEZ and sustainable urban logistics. Then the facilitator explains the rules of the game and the game play starts. After the end of each round, the facilitator invites the participants to reflect the game play and leads a discussion on how participants can relate the game to their business experiences. After the last round, participants are asked to reflect on the policies developed during the game and on the strategies they followed. During the workshop observers fill out data collection templates with observations from the gaming sessions. At the end of the session participants fill out a post sessions survey where they record their experience from the gameplay. Players have to make trade-offs to make sure that all 3 KPIs (cost, efficiency and client satisfaction) are balanced. Efficiency is quantified at two levels: firstly, as a percentage of the maximum achievable efficiency within a single chain, and secondly an overall efficiency at urban level, where the maximum achievable efficiency is defined by the optimum asset sharing through players horizontal cooperation.

The average duration of a game session is expected to be between 3-3,5 hours.

4.2.3. Game play sessions

GROT is a pro-active public administration that holds close relation to the logistic stakeholders in the study area. GROT will mobilize the following channels and networks for the required data collection:

- Survey results and surveyed community of the EVOFENEDEX survey, launched in March 2020
- The Logistiek010 community, some 1200 member organisations are linked to the Logistiek010 platform. A website (www.logistiek010.nl), a digital newsletter and two meetings a year with > 100 participants
- The community of (potential) signatories of the Covenant for the introduction of a ZE City Logistics zone (ZECL zone), each having vowed to carry out a number of actions which contribute to the successful introduction of the zone in 2025.

We estimate that approximately 3 game sessions with stakeholders will take place during late spring and summer of 2021.[7]

4.3. Autonomous vans (AVs) demonstration freight stakeholders survey

The objective of the interviews is to collect feedback on the demonstration with autonomous vans (AVs) in Rotterdam. The interviews will focus on the initial expectations and the experiences before and after the demonstrations. Furthermore, we are going to collect information about their decisions and barriers to adopt new technologies. For this reason, two rounds of questionnaires (before and after demonstrations) concerning AVs have been designed. The questionnaires about autonomous vans are the same for Rotterdam and Oxfordshire.

As part of the HARMONY project, demonstrations will take place with autonomous vans (AVs) in freight operations. Two rounds of questionnaires will take place in both cities. One before and one after the AVs demonstration.

[7] The number of game sessions is subject to COVID-19 regulations. We make the assumption that by that time the rules will enable us having sessions of 10 people in the same room.

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4.3.1. Pre demonstration Questionnaire for Rotterdam

This survey aims at investigating freight stakeholders' views about their:

1. Motivation behind participating in the Autonomous Van demonstration.
2. Expectations regarding the Autonomous Van demonstration.
3. Concerns and barriers for adopting Autonomous Vans in their own freight operations.

The full questionnaire about the AVs pre-demonstration for Rotterdam can be found on Appendix 11. All the information that will be provided, will be aggregated, handled anonymously and used only for research purposes.

4.3.2. Post demonstration Questionnaire for Rotterdam

This survey aims at investigating freight stakeholders' views about:

1. Satisfaction levels following the Autonomous Van demonstration.
2. Expectations regarding Autonomous Vans following the demonstration.
3. Concerns and barriers for adopting Autonomous Vans in freight operations.

The full questionnaire about the AVs post-demonstration for Rotterdam can be found on Appendix 12. All the information you provide will be aggregated, handled anonymously and used only for research purposes.

All surveys for Rotterdam are presented in Figure 24.

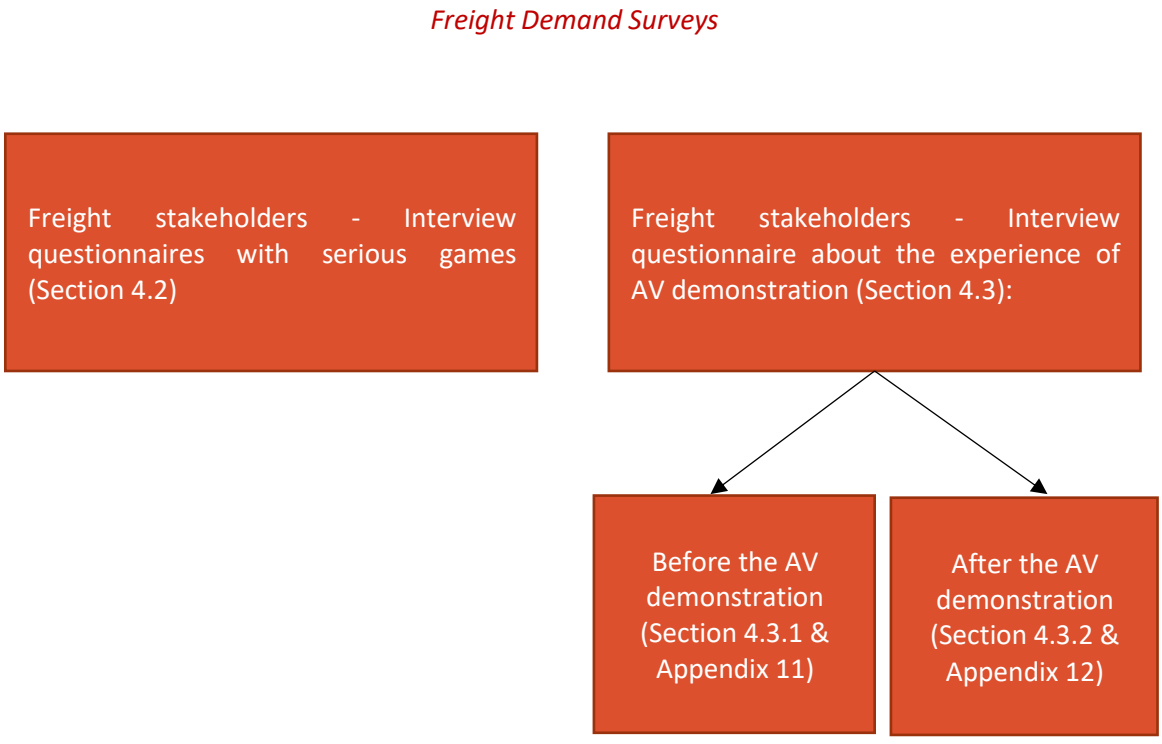

Figure 24: Designed Surveys for Pilot City: Rotterdam

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5. Survey tools for Oxfordshire

5.1. Passenger travel demand survey

The objective of HARMONY for Oxfordshire is to apply the Strategic and Tactical simulators of the HARMONY Model Suite. A Passenger travel survey will take place in the metropolitan area of Oxfordshire. This survey will consist of:

- Household questionnaire (Revealed preference; RP)
- Individual questionnaire (RP) with SPs-based on the satellite about:
  - Mobility tool ownership and usage,
  - Residential location choice,
  - Teleworking / Flexible working,
  - Mode choice, and
  - Dynamic travel planning within the day
- Activity diary (RP) (the input will be through MOBYapp)

This Section is described in detail in Section 2.2, all the tools that have been developed for this survey in Section 2.3 and the questionnaire can be found in Appendix 2.

5.2. Autonomous bus demonstration – passengers

The passenger travel survey described in 5.1 will also be used for the autonomous buses' demonstration. The only difference is that this survey will include extra attitudes and perceptions about AV buses, as well as that it will take place in three waves, as it is described in the Figure 25 below.

Each participant will use the MOBYapp for:

- 1 week (7 days) – before the AV-bus demonstration,
- 1 week (7 days) – during the AV-bus demonstration,
- 1 week (7 days) – after the AV-bus demonstration.

Each data collection round will run for a 3-week time window, as not all participants will start at the same time. There will be a 1-2 weeks interval before and after the demonstration.

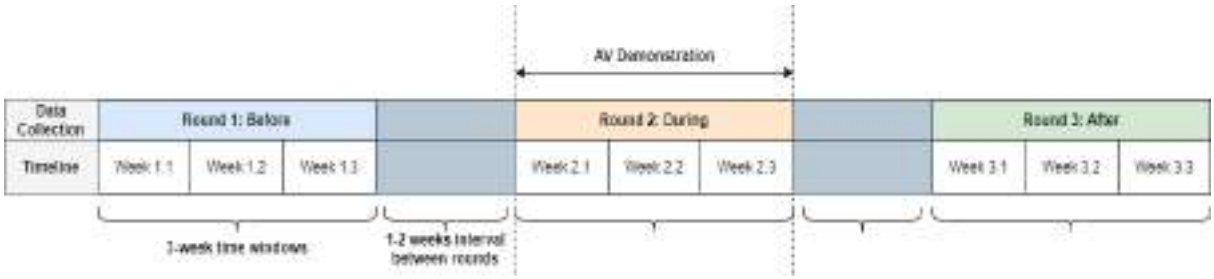

Figure 25: Waves regarding the AV buses demonstration.

5.3. Autonomous vans (AVs) demonstration freight stakeholders survey

The objective of the interviews is to collect feedback on the demonstration with autonomous vans (AVs) in Oxfordshire. The interviews will focus on the initial expectations and the experiences before and after the demonstrations. Furthermore, we are going to collect information about their decisions and barriers to adopt new technologies. For this reason, two rounds of questionnaires (before and after demonstrations) concerning AVs have been designed. The questionnaires about autonomous vans are the same for Rotterdam and Oxfordshire.

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As part of the HARMONY project, demonstrations will take place with autonomous vans (AVs) in freight operations. Two rounds of questionnaires will take place. One before and one after the AVs demonstration.

5.3.1. Pre demonstration Questionnaire for Oxfordshire

This survey aims at investigating freight stakeholders' views about their:

1. Motivation behind participating in the Autonomous Van demonstration.
2. Expectations regarding the Autonomous Van demonstration.
3. Concerns and barriers for adopting Autonomous Vans in their own freight operations.

The full questionnaire about the AVs pre-demonstration for Rotterdam can be found on Appendix 11. All the information that will be provided, will be aggregated, handled anonymously and used only for research purposes.

5.3.2. Post demonstration Questionnaire for Oxfordshire

This survey aims at investigating freight stakeholders' views about:

1. Satisfaction levels following the Autonomous Van demonstration.
2. Expectations regarding Autonomous Vans following the demonstration.
3. Concerns and barriers for adopting Autonomous Vans in freight operations.

The full questionnaire about the AVs post-demonstration for Rotterdam can be found on Appendix 12. All the information you provide will be aggregated, handled anonymously and used only for research purposes.

5.4. Unmanned aerial flying vehicles (UAVs) demonstration stakeholders survey

As part of the HARMONY project, a demonstration will take place in Oxfordshire to test unmanned aerial flying vehicles (UAVs) in freight operations. Two rounds of questionnaires will take place in Oxfordshire. One before and one after the unmanned aerial flying vehicles (UAVs)'s demonstration.

5.4.1. Pre demonstration Questionnaire for Oxfordshire

This survey aims at investigating stakeholders' views about their:

1. Motivation behind participating in the unmanned aerial flying vehicles (UAVs) demonstration.
2. Expectations regarding the unmanned aerial flying vehicles (UAVs) demonstration.
3. Concerns and barriers for adopting unmanned aerial flying vehicles (UAVs) in freight operations.

The full questionnaire about the unmanned aerial flying vehicles (UAVs)'s pre-demonstration for Oxfordshire can be found on Appendix 13. All the information you provide will be aggregated, handled anonymously and used only for research purposes.

5.4.2. Post demonstration Questionnaire for Oxfordshire

This survey aims at investigating stakeholders' views about their:

1. Satisfaction levels and expectations following the unmanned aerial flying vehicles (UAVs) demonstration.
2. Concerns and barriers for adopting unmanned aerial flying vehicles (UAVs) in freight operations.

The full questionnaire about the unmanned aerial flying vehicles (UAVs)'s post-demonstration for Oxfordshire can be found on Appendix 14. All the information you provide will be aggregated, handled anonymously and used only for research purposes.

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5.5. Sampling strategy

5.5.1. Sampling strategy for Oxfordshire's passenger survey

The sampling strategy as presented in section 2.4.2 is stratified. The parameter used for the sampling design was car ownership. By taking into consideration the total population of the study area and the budgetary constraints, the required number of participants for Oxfordshire should be between 1606 - 2027 for 93% - 94% of confidence level (Table 6).

Confidence level	Required individuals	Sample for No cars or vans in household	Sample for 1 car or van in household	Sample for 2 cars or vans in household	Sample for 3 cars or vans in household	Sample for 4 or more cars or vans in household
93%	1606	281 individuals	666 individuals	493 individuals	119 individuals	47 individuals
94%	2027	355 individuals	840 individuals	623 individuals	150 individuals	59 individuals

Table 6: Sampling strategy for Oxfordshire residents survey

In addition, to ensure representativeness of the population the total sample should meet the below proportions:

- Gender: 50% males, 50% females. In some areas (traffic zones) where different gender distribution has been observed (based on the census data), different proportions are provided.
- Employment Status: 82.7% of them should be employed with age between 18-64 years old.

The sampling strategy for the Passenger travel survey in Oxfordshire is presented in detail in Appendix 4 & 5.

5.5.2. Sampling strategy for Oxfordshire's freight interview questionnaires

The stakeholders (companies and authority) who will be involved in the demonstration will be interviewed before the demonstration and after the demonstration to check if their opinions changed once they will have a real-world experience.

5.5.3. Sampling strategy for Oxfordshire's AV bus demonstration

The operating authority of the location where the AV bus demonstration will take place (Milton Park) will undertake the recruitment of 30 to 50 individuals. The pre-requisite is that those individuals will use the AV bus for their trips within the Milton Park.

All surveys for Oxfordshire are presented in Figure 26.

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Passenger Travel Demand Surveys

- Household questionnaire (Revealed preference; RP) (Section 2.2 & Appendix 2)
- Individual questionnaire (RP) with SPs (Section 2.3) about:
  i. Mobility tool ownership and usage,
  ii. Mode choice, and
  iii. Dynamic travel planning within the day
- Activity diary (RP) (Section 2.1)

Passenger survey for AV demonstration (Section 5.2)

Freight Demand Surveys

Freight stakeholders - Interview questionnaire about the experience of AV demonstration (Section 5.2):

- Before the AV demonstration (Section 5.2.1 & Appendix 11)
- After the AV demonstration (Section 5.2.2 & Appendix 12)

Freight stakeholders: Interview questionnaire about the experience of unmanned aerial flying vehicles (UAVs) demonstration (Section 5.3):

- Before the UAV demonstration (Section 5.3.2 & Appendix 13)
- After the UAV demonstration (Section 5.3.3 & Appendix 14)

Figure 26: Designed Surveys for Pilot City: Oxfordshire

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6. Survey tools for Trikala

6.1. Surveys and questionnaires

The scope of this survey is to explore preferences regarding the use of innovative mobility services and technologies in the last mile of urban and suburban delivery of goods. Given that a HARMONY demonstration will take place in Trikala, GR, we consider this survey to collect supplementary data regarding individual preferences and attitudes towards the use of such transport modes in the last mile of the delivery process (chain).

For this purpose, there will be two types of survey. One type of survey will be for pharmacists and residents of the villages around Trikala, and it will be paper based directly linked to the pilot survey that will run in the area. The other type of survey will appeal to the general population of the Trikala region. It will be an online questionnaire that will include SPs about the cost of using unmanned aerial flying vehicles (UAVs) for transferring pharmaceutical/paramedics products.

Paper-based questionnaire

Regarding the first survey, personal interviews with pharmacists and residents will be conducted using a semi-structured questionnaire. Four paper-based questionnaires (two for pharmacists before-after and two for residents before-after) have been developed and the study will run into two phases in the villages that the unmanned aerial flying vehicles (UAVs) demonstration will take place. The first phase will be during the demonstration and the second will take place after the unmanned aerial flying vehicles (UAVs) demonstration.

The questionnaire for pharmacists will gather information regarding:

1. the frequency of emergency orders and the type of them;
2. the cost that pharmacists would be willing to undertake for using unmanned aerial flying vehicles (UAVs);
3. motivations for a permanently unmanned aerial flying vehicles (UAVs) service for last mile delivery in their area in the future;
4. expectations regarding the use of unmanned aerial flying vehicles (UAVs);
5. concerns abouts the use of unmanned aerial flying vehicles (UAVs).

The questionnaire for residents will gather information about:

1. participants socio-economic characteristics;
2. current procedures of buying pharmaceutical items;
3. motivation behind participating in this pilot;
4. expectations regarding the use of unmanned aerial flying vehicles (UAVs);
5. concerns and barriers of using unmanned aerial flying vehicles (UAVs) services for picking up products.

The data collection will take place in the villages that are located close to the city of Trikala. It is not yet decided which villages will participate in the study.

Online questionnaire

Regarding the second survey, an online questionnaire will be used for the wider population in the municipality of Trikala. It will collect data both for the household and the household members to capture the household interactions concerning their attitudes and perceptions towards the use of unmanned aerial flying vehicles (UAVs), mode choice for deliveries, current practices for purchasing pharmaceutical products, and products that are not always available in the local market.

The questionnaire will be divided into five sections. The first section will collect information regarding their socio-economic characteristics. The second and the third will include questions for their

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travel behaviour and their access to pharmacies respectively. The fourth will be about their knowledge and opinion regarding the use of unmanned aerial flying vehicles (UAVs). It will include SPs for the cost of using them for transferring pharmaceutical/paramedics products. Finally, the fifth section will include questions about attitudes regarding COVID-19.

All questionnaires can be found in Appendices 10.6, 10.7, 10.8, 10.9 and 10.10.

All the information that will be provided, will be aggregated, handled anonymously and used only for research purposes.

6.2. Sampling strategy (random sample)

The sampling strategy to be followed in the passenger survey in Trikala will be simple random sampling. The simple random sample means that every individual of the population has an equal probability of inclusion in the sample (Ghauri and Gronhaug, 2005; Hamed Taherdoost, 2016).

The eligibility criterion for an individual to participate in the interview questionnaire is to live in one of the villages where the pilot will take place and be adults. The parameters for selecting the sample are; 1. The area of residence, 2. be customers of the pharmacists of the participating in the pilot village(s) and 3. be above 18 years old. For the online questionnaire, criteria are to leave in the municipality of the city of Trikala and be adult.

All surveys for Trikala are presented in Figure 27.

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Freight Demand Surveys

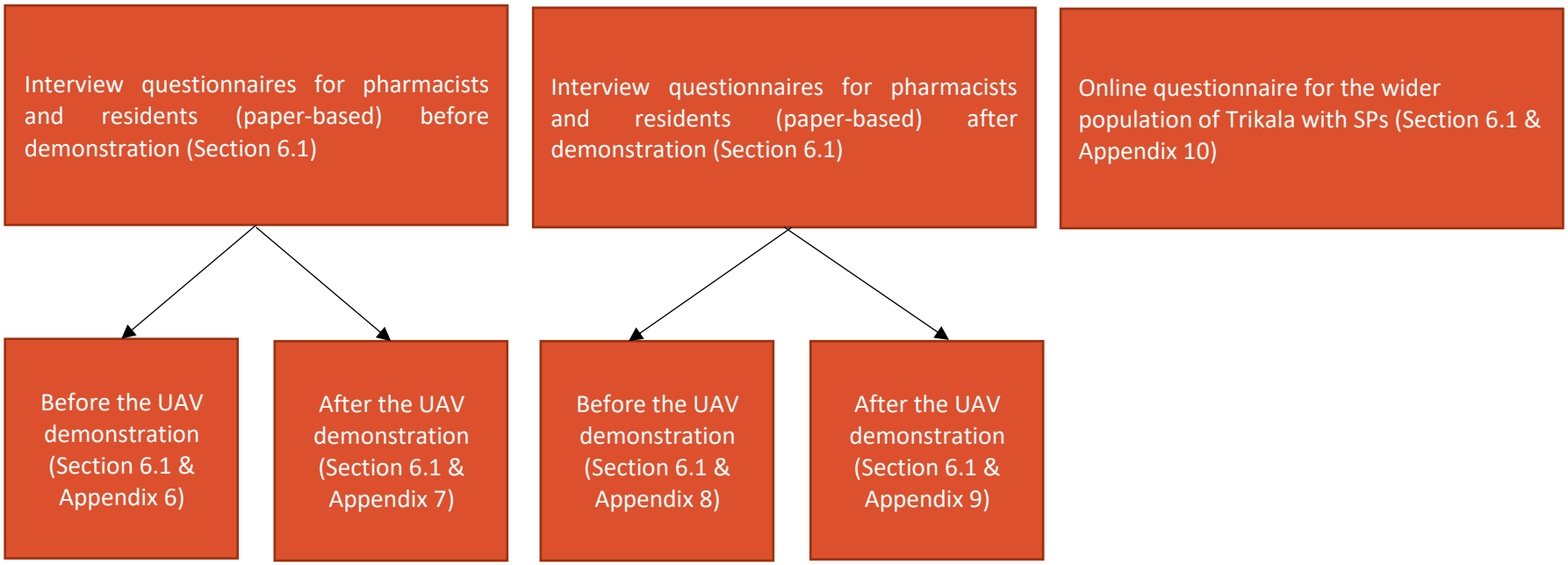

Figure 27: Designed Surveys for Pilot City: Trikala

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7. Ethical Aspects

This chapter presents the details of the data storage, protection and databases

7.1. Informed Consent

As outlined in Section 2.1, the MOBYapp has two main components: the smartphone application and the website:

1. The smartphone application that tracks the participant via their mobile phone and hosts the validation service and the evaluation process as well and
2. the website, which is the User Centre that hosts all the Individual questionnaires (RP) and Stated preference scenarios (SPs).

The data generated and harvested through the survey process is stored in local databases on the MOBY-x servers. Transformation of raw locational data takes place in order to prepare and reshape the databases to meet the needs of the modelling and other analysis techniques that will be used for analysis.

7.2. Data protection, FQA and GDPR standards

Since MOBYapp collects personal information about the participants, MOBY-x and all the partners (UCL, TRT, TUD, OCCC, UAEGEAN, eTRIKALA) that are involved in the collection of data comply with the GDPR standards. More specifically:

Survey's purpose

The online and paper-based survey will be implemented as part of the HARMONY H2020 project. The main goal of the HARMONY project is to develop a Model Suite (MS) as a multi-scale, software-agnostic, integrated activity-based model system. This model enables end-users to link independent models and analyse a portfolio of regional and urban interventions for both passenger and freight mobility. These interventions would include policies and capital investments, land-use configurations, economic and sociodemographic assumptions, travel demand management strategies and new mobility service concepts. The main objective behind the model system's architecture is to enable the evaluation of such interventions with regards to their impact on land-use, economic growth, transportation networks, energy, vehicular noise and emissions, while, at the same time, provide recommendations for Sustainable Urban Mobility Plans (SUMPs) of the new mobility era.

Request participant's consent

During the registration phase, we request for users' consent to store and process his/her generated data. A screen is presented to the individuals with information about 1. Types of collected data, 2. Right to access, 3. Right to be forgotten, 4. Methods of processing, 5. Place of processing, and 6. Retention time. The document is available at all the interfaces of the MOBY-x User Centre and the user can access it at any time. The Privacy Policy document is available at (http://mobyx.co/)

In addition, the FAQ document below, provides further information in a user-friendly manner to the participants.

- What is the survey's purpose?
  The online and paper-based survey will be implemented as part of the HARMONY H2020 project. The main goal of the HARMONY project is to develop a Model Suite (MS) as a multi-scale, software-agnostic, integrated activity-based model system. This model enables end-users to link independent models and analyse a portfolio of regional and urban interventions for both passenger and freight mobility. These interventions would include policies and capital investments, land-use configurations, economic and sociodemographic assumptions, travel

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demand management strategies and new mobility service concepts. The main objective behind the model system's architecture is to enable the evaluation of such interventions with regards to their impact on land-use, economic growth, transportation networks, energy, vehicular noise and emissions, while, at the same time, provide recommendations for Sustainable Urban Mobility Plans (SUMPs) of the new mobility era.

- Why do you need participants in the project?
  Part of the project is examining how new mobility services impact travellers' decisions. As such, we are inviting citizens to take part on our surveys so we can understand how they travel now, and how they would when emerging mobility services will be available in the market. We also collect information about their preferences for the new services., so we can create these to best fit their needs.

- Do I have to take part?
  It is up to you to decide to take part or not. If you do decide to take part, you will be able to download this information sheet and you will be asked to give your consent. You can withdraw at any time without giving a reason and without penalty.

- How long will this survey take and what will happen to me if I take part?
  If you consent to participate in this survey and download/install the MOBYapp, you will be asked to provide some information about socio-demographic and household characteristics, data about travel patterns and most visited locations. This will take between 5-10 minutes. Then during the next week, you have, to open the app once per day at least, and verify your activity diary (this will take between 2-5 minutes depending on the number of activities you conducted during the day). In the second day, you will be asked to provide information on planning and decision-making objectives, planning processes, actions and tools (SPs). In the fourth and sixth day you will be asked again to provide the same information and we will see how these have changed during the seven days survey. You can see all the tasks at Figure 28. The completion of this survey is the only task included in your participation to the study.

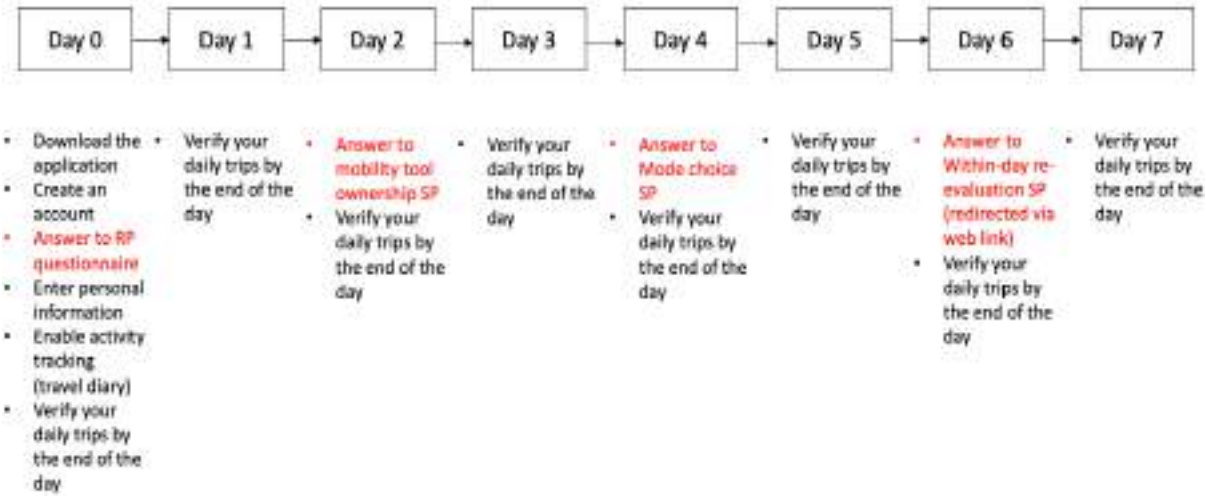

Figure 28: User's tasks for the entire survey

- What are the possible disadvantages and risks of taking part?
  We do not foresee any discomforts, disadvantages or risks to participants of the survey.

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- Can the application be used on more than one device?
  You may run the application on more than one device. However, you should only be signed in to one account at a time. If the application is tracking locations on more than one device, the location traces will be incorrect.

- Do I have to have a data plan to run the app?
  You do not need to have a data plan to run the app. Under the app's Settings Data Sync preferences, you may set the app to sync collected data using a mobile data plan only, Wi-Fi only, or both the Wi-Fi and mobile data plan. If you are using both Wi-Fi and the mobile data plan, the tracking will be more efficient. If you do not have a data plan, you may set the sync to "Wi-Fi only".

- What about my phone's battery?
  It is possible that the use of this app on top of your normal phone use will drain the battery faster than the rate to which you are accustomed. You should plan to charge your battery regularly and monitor the battery level.

- What if my activity icon is in the wrong location?
  Your activity location may be slightly off due to the aggregation of data points. In these cases, you may move the icon by dragging it with your finger to the proper location.

- What is the difference between non-travel activities (main and secondary activities) and travel activities?
  A travel activity is when you used a mode of transportation to move between two locations. This mode can include walking or biking in addition to motorized forms of transportation. A non-travel activity (main and secondary activities) is something that you did when you stayed at one location, like staying at home, be at work, a personal task, like shopping, eating in a restaurant or entertainment for example, etc.

- What is a change mode activity?
  Sometimes, you will use more than one form of transportation to travel between activities (for example, walking to the bus stop, or transferring from car to a bus). The "change mode" activity reflects that point of change.

- What if I have changed my mode but this activity is not reflected in my activity diary?
  If you know that you have changed mode, but this is not shown in your diary, please treat this as a missing activity and add a non-travel activity (main activity).

- Why are my traces so 'spiky?
  MOBYapp uses GPS, GSM, Wi-Fi, and accelerometer data. Sometimes, when GPS data isn't available, we will collect location data from the nearest cell towers, which give us less accurate locations. This data collection will result in 'spiky' traces, or straight lines between activities.

- What if I participated in more than one activity at a certain location?
  If you took part in more than one activity, first choose the activity that you would consider 'main' and then choose the additional activities

- What if I travel to another city or country while running the app?
  The app is created so that it can track travel anywhere in the world, but it will collect only the activities which is done in the city's survey you have declared that you will participate in the beginning.

- Data about travel patterns and most visited locations (responses) – what is it?
  By responses, we refer to the answers that you will provide in this survey. The only personal data that you will be asked for is the location of your residential, work and leisure activities. All

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the other questions do not require the release of any further personal data, and thus to avoid any confusion, we call them responses.

- All these are personal data – what will happen with them?
  This survey collects socio-demographic data, household characteristics data, data about travel patterns and most visited locations. It also collects data about your attitudes and preferences for new mobility services.
  Personal data relates to a living individual who can be identified from that data. Identification can be by the information alone or in conjunction with any other information in the data controller's possession or likely to come into such possession. The processing of personal data is governed by the General Data Protection Regulation (the "GDPR"). The only personal data that you will be asked for is the location of your residential, work and leisure activities.

- How do we process your personal data?
  MOBY-x, UCL, UAEGEAN, ICCS that are the Data Controllers, as well as the remaining HARMONY partners, that are based in Europe, comply with the obligations under the "GDPR" by keeping personal data up to date; by storing and destroying it securely; by not collecting or retaining excessive amounts of data; by protecting personal data from loss, misuse, unauthorised access and disclosure and by ensuring that appropriate technical measures are in place to protect personal data.

- Sharing your data/responses
  Your personal data and responses will also be used by some of the HARMONY partners. The HARMONY partners will use your personal data and responses only for the purposes of the research of the HARMONY project. No personal data will be shared with external parties.

- Your rights and your personal data
  You have the right, at any time, to know whether your Personal Data has been stored and can consult Data Controllers to learn about their contents and origin, to verify their accuracy or to ask for them to be supplemented, cancelled, updated or corrected, or for their transformation into anonymous format or to block any data held in violation of the law, as well as to oppose their treatment for any and all legitimate reasons. Requests should be sent to the Data Controllers (info@mobyx.co)

- What if something goes wrong?
  If you are concerned about any part of this research, your participation or you have any complaint, please contact with MOBY-x (info@mobyx.co)

- Limits to confidentiality
  Please note that assurances on confidentiality will be strictly adhered to unless evidence of wrongdoing or potential harm is uncovered. In such cases the MOBY-x may be obliged to contact relevant statutory bodies/agencies.

- What will happen to the results of the research project?
  The results of the survey will be shared among partners of the HARMONY project, so that they be able to develop the HARMONY Model Suite (MS) as a multi-scale, software-agnostic, integrated activity-based model system. This model enables end-users to link independent models and analyse a portfolio of regional and urban interventions for both passenger and freight mobility. The main objective behind the model system's architecture is to enable the evaluation of such interventions with regards to their impact on land-use, economic growth, transportation networks, energy, vehicular noise and emissions, while, at the same time, provide recommendations for Sustainable Urban Mobility Plans (SUMPs) of the new mobility era.

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- Who is funding the research?
  Funding is provided by EU Research and Innovation programme - Horizon 2020.

Data anonymisation

Data is anonymized using pgantomizer (https://github.com/asgeirrr/pgantomizer) that assures that even if we need to provide data to people that should not have access to the personal information, the users' anonymity will be protected. Importing the data to third-party tools, where we cannot guarantee what will happen to the data, is also a common use case.

Right to Access & Portability

The users have the possibility to request and obtain their data from the data controllers.

Right to be forgotten

The users have the right to request for their data to be deleted/completely removed from the data controllers' datasets.

Territorial Scope, Data Controllers and Processors

The data is collected in Europe, by tools that have been developed by MOBY-x. MOBY-x, UCL, UAEGEAN are the data controllers and are based in Europe. More specifically, MOBY-x is the data controller of the registration, tracking and trip validation data, MOBY-x, UCL, UAEGEAN are the data controller of the questionnaire data. These organisations store the data on servers that are located in Europe. More specifically MOBY-x stores the data on a server that is based in Brussels, UAEGEAN stores the data on a server that is based in Greece, while UCL stores the data on a server based in the UK. The questionnaire data from MOBY-x is anonymised. MOBY-x hosts the complete database.

7.3. Interviews Ethics

We have drafted the Consent Form for interview participants and can be found on Appendix 15.

7.4. Data storage, Basic system process and Database architecture

Data storage

Apart from the data posts to the server, MOBY-x server hosts a PostgreSQL database management system (Figure 29) that hosts all the user, locational, activity and survey databases that the user generates during the survey period. The data is stored locally on the MOBY-x's server.

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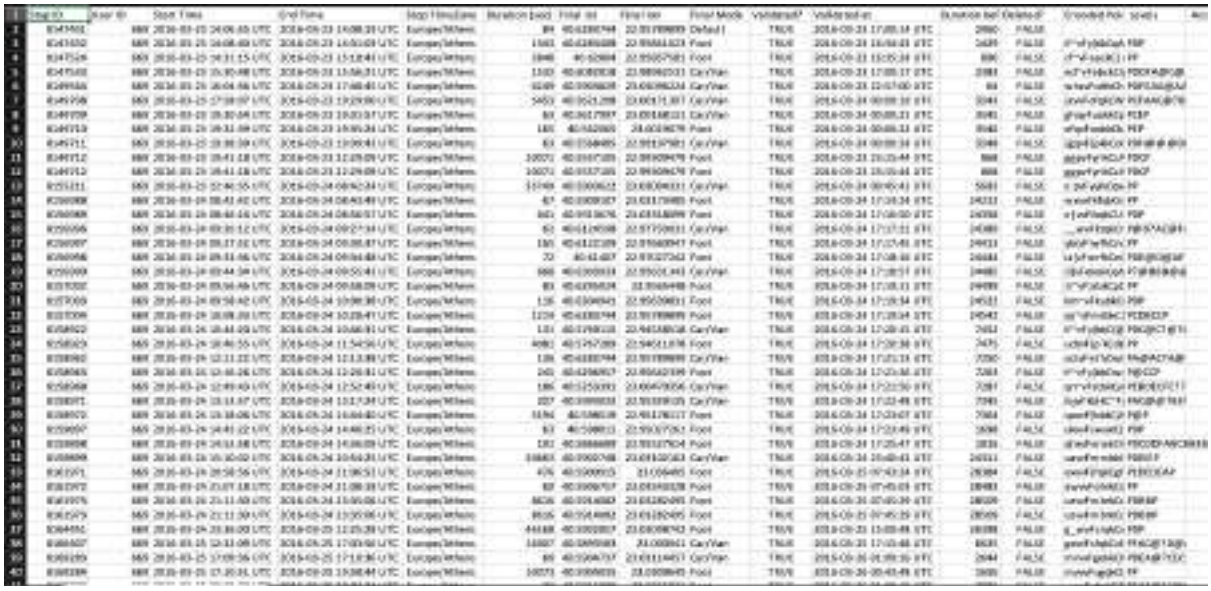

Figure 29: Data storage system

Basic System Process and Database Architecture

The main user hub is the MOBYapp and then the User Centre, hosted on the MOBY-x's server. The app guides the users through the three different steps required to successfully complete the survey:

Step 1

Users download and open the app and after creating an account with some personal profile details, they have to complete the initial pre-survey questionnaire with various socio-demographic questions and transport-related choices and preferences. The survey was deployed as a Web application and was built to be responsive and cross-platform so that users across multiple browsers, devices and systems would be able to access it easily. A web application was developed using the Ruby on Rails (http://rubyonrails.org/) open-source framework based on the Ruby programming language. We opted to use a web application built from scratch using Rails, rather than an already existing survey development tool, to give us more flexibility and customisation when creating the SP experiment. The data from the completed surveys are automatically verified and stored in secure servers in a MySQL (https://www.mysql.com/) database system. This was used as the database design as it can follow a relational database structure and MySQL is an open source, robust system that can handle numerous concurrent users. This structure was designed in a form necessary for choice modelling exercises, to enable seamless export into other bespoke analytical tools. The data is stored on MOBY-x's server and then is communicated to the users through the MOBYapp as a Web link to follow. The MOBYapp is linked to the pre-survey questionnaire and only users that have completed it, can proceed with actual use of the mobile app and tracking of their trips.

Step 2

After the users have successfully completed all actions in Step 1, they can start with tracking their trips. During tracking, the app posts raw locational data to the MOBY-x's server (PostgreSQL database with PostGIS extension). The raw data is transformed using several queries and algorithms that are applied to the raw data. The main algorithms are "Activity Detection" and "Mode Detection". The former tries to cluster raw position data and predict the actual places (aka activities) visited. The latter tries to identify the exact travel modes between every two activities. Any frequent activities saved by the user in the mobile app, are exploited in order to reduce unknown activities that will need validation. Following, the MOBY-x User Center is updated with the "detected" user travel data.

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The Activity detection algorithm is quite crucial for the accuracy of the detection process and the final user experience for the app users. The algorithm clusters together a set of raw locations that are close enough (within a circle of configurable radius, e.g., 50 meters). A location cluster is considered as an activity when the person stays within this cluster for a time greater than a minimum time period (also configurable). Finally, clusters that are created close enough (in a configurable distance of their centers) are merged to one cluster. Appropriate adjustment of the configurable parameters of this algorithm (potentially slightly different per survey city) results in more accurate results.

Step 3

Users can see their generated travel data on "My Activities" page on the MOBYapp. The users then validate their trips and activities and the validated data ("actual" travel data) are stored in the MOBY-x server and in the app. Validation can be done per individual activity or travel mode between activities or for the entire day. This completes the data collection process and the user interactions with it. The actual data is then used to derive the final database records that will further feed the mobility models and the respective analysis."

Key Database Schema Entities

In the following sections, the key database entities (tables) are listed. Other peripheral tables or relationships and constraints are not included for brevity.

Table 7: Key Database Schema Entities

LOCATIONS (the table with all raw location data recorded. The data is transmitted to DB in near real-time)	
userId	UUID
isMoving	Boolean
timestamp	Utc timestamp
odometer	float
latitude	float
longitude	float
accuracy	float
speed	float
heading	float
altitude	float
activityType	String (the travel mode as initially detected by the geolocation mechanism)
activityConfidence	string
batteryCharging	boolean
batteryLevel	float
used	Boolean (indicates whether a specific location has been used in the trip detection algorithms)
TRIPS (the table where all trips are stored after the location data processing)	
tripId	UUID

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from (trip starting at)	UTC timestamp
to (trip ending at)	UTC timestamp
placeId	UUID (foreign key to **Places** table)
userId	UUID (foreign key to **User** table)
PLACES (aka Activities)	
placeId	UUID
title	string (default: 'Uknown Place')
address	string
latitude	float
longitude	float
isTransit	boolean
saved (true if: specific place is in 'saved places' of a user)	boolean
createdAt	
updatedAt	
userId	UUID (foreign key to **Users** table)
primaryActivityId	UUID (foreign key to **ActivityTypes** table)
secondaryActivityId	UUID (goreign key to **ActivityTypes** table)
ACTIVITYTYPES (work, home, etc...)	
activityTypeId	UUID
activityTypeName	string
STAGES (every stage is connected to a trip. It represents the way the user went from one place to the next place of a trip)	
staged	UUID
Value	Int (minutes)
createdAt	
updatedAt	
modeId	UUID (foreign key to **Modes** table)
tripId	UUID (foreign key to **Trip** table)
numberOfPeople	int
ticketCost	int
paymentMethod	string
busTypeId	UUID (foreign key to **BusTypes btable**)
...	(other stage-related informaiton)
MODES (how a stage was travelled: car, foot etc..)	

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modeId	UUID
name	string

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8. Conclusions

This deliverable outlined the details of the sampling strategy, the data collection techniques and tools that will be used in HARMONY pilot areas. More specifically, it focused on the design of the questionnaires, the preparation and customisation of the smartphone-based travel survey tool for primary data collection, the design of the survey participants support interfaces (helpdesks), as well as the development of the sampling strategies that will be used in each pilot area. The questionnaires for passengers will include both quantitative and qualitative data regarding individual and household socio-economic characteristics, mobility tool ownership, attitudes and perceptions towards multimodality, traditional and new mobility services. Also, State-of-the-art experiments using serious gaming techniques were presented, which are designed to capture individual's preferences for residential location, vehicle ownership, mode choice, and spatiotemporal activity changes given new mobility services and spatial policies. Moreover, the questionnaires for the freight stakeholders in Rotterdam and Oxfordshire were presented that were designed to collect information about their decisions and barriers to adopting new technologies (i.e., AVs and unmanned aerial flying vehicles (UAVs)) or services (i.e., crowd-shipping). Finally, the two rounds of questionnaires were presented that were designed for the "before and after" AVs and unmanned aerial flying vehicles (UAVs) freight demonstrations. All the surveys that have been designed for the T3.1 "Design of data collection techniques and tools" can be found on Figure 30.

The presented survey tools will be used for collecting primary data from both passengers and freight stakeholders in the pilot areas. The collected data will be used for the development of the tactical and operational passenger simulators in WP5 and WP7, as well as for the development of the tactical freight simulator in WP6. These simulators along with the strategical simulator will be hosted within the HARMONY MS, while a sub-set of the collected data will be used for validating the outputs of HARMONY MS business as usual - basic scenarios for the pilot areas.

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Figure 30: Survey tools designed for each HARMONY metropolitan area to collect primary data

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10. Appendices

10.1. Passenger survey questionnaire for Turin (IT)

Appendix 1: Passenger survey questionnaire for Turin (IT)

Question	Response options - Turin
Page 1: Socio-economic characteristics	
How old are you?	[NF 18-99]
What is your gender?	Male Female Other Prefer not to answer
In which area do you live	See sheet "National_drop down"
What is the highest degree or level of education you completed?	Less than high school High school diploma or equivalent Bachelor's degree Master's degree Doctoral degree Other
What is your employment status?	Full time paid employment (40 hours a week) Part-time paid employment (less than 30 hours a week) Full time self-employment (40 hours a week) Part time self-employment (less than 30 hours a week) Student

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	Unemployed or looking for work Unable to work because of long-term illness or disability Retired Looking after home or family Other
Which of the following best describes your working schedule?	Fixed work schedule Flexible work schedule - with flexibility in finish times only Flexible work schedule - with flexibility in start times only Flexible work schedule - with flexibility in both start and finish times Rotating shift work schedule
Do you always work in the same place or work at multiple locations? (If you both work from home and work on site, please only consider the work performed outside of you home)	No Yes
How many days in an average week do you: **- work from home?** **- travel to work?**	None 1 day 2 days 3 days 4 days 5 days More than 5 days
What is your marital status?	Single Married/Civil partnered Divorced Widowed

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Including yourself, how many people live in your household?	[NF 1-12]
Who else lives in your household? Please select all that apply.	Spouse/Partner Parent(s) or parent(s)-in-law Child(ren) Grandchild(ren) Other relative Live-in domestic helper Other non-relative/roommate/housemate Prefer not to answer
How many children do you have?	
How many children between the age of 0 to 12, live with you?	[NF 0-12]
How many children between the age of 13 to 18, live with you?	[NF 0-12]
Thinking about all sources of income such as salary/wages, benefits, pensions and so on, which numbers best represent the total annual income of your household before taxes and other deductions?	Under 15,000€ 15,000€ - 24,999€ 25,000€ - 34,999€ 35,000€ - 49,999€ 50,000€ - 74,999€ 75,000€ or more Prefer not to answer/Don't Know
The following categories are normally used to classify households based on their socio-economic status: high, higher middle, middle, lower middle or low. Where would you place your household? (Please select one answer only)	High Higher middle Middle Lower middle Low Prefer not to answer

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How many people in your household are employed (including full-time, part-time and self-employed)?	[NF <=hh_size]
How many people in your household are holding valid driving licences?	[NF <=hh_size]
Do you hold any of these types of driving licences? Please check all that apply if licence is currently valid	No Full licence - car Full licence – motorcycle or scooter
What type of dwelling are you currently living at?	Terrace house Semi-detached house Detached house Bungalow Converted flat Purpose built flat (less than 6 storeys high) Purpose built flat (at least 6 storeys high)
How far are the following places away from your home? **- Nearest bus/tram stop** **- Nearest train station** **- Nearest grocery store** **- Nearest park/green space**	Less than 0.5 km 0.5-1 km 1-2 km 2-3 km 3-5 km 5-7 km 7-10 km More than 10 km
Page 2: Travel behaviour information	
How many cars does your household own or has access?	0 1

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	2 3 3+
Does your household have access to a leased car or company car?	No Yes
Are you the main driver of any of these cars?	No - I do not have regular access to any cars Yes - but I shared a car with other household members Yes
For the vehicle you are the main user, please reply to the follow questions	
What kind of vehicle is it?	Hatchback Estate SUV Saloon Coupe Convertible MPV Pickup
What type of fuel does your vehicle use?	Petrol Diesel Compressed natural gas (CNG) Liquefied petroleum gas (LPG) hybrid Plug-in hybrid Electric Other energy souse (e.g. ethanol, hydrogen)

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What is the level of driving automation?	**Level 0** : **You <u>are</u> driving** whenever these driver support features are engaged - even if your feet are off the pedals and you are not steering. **You must constantly supervise** these support features: you must steer, brake or accelerate as needed to maintain safety. These features **are limited** to providing warnings and momentary assistance. For example: automatic emergency braking, blind spot warning, lane departure warning. **Level 1** : **You <u>are</u> driving** whenever these driver support features are engaged - even if your feet are off the pedals and you are not steering. **You must constantly supervise** these support features: you must steer, brake or accelerate as needed to maintain safety. These features provide steering **OR** brake/acceleration support to the driver. For example: lane centering **OR** adaptive cruise control. **Level 2** : **You <u>are</u> driving** whenever these driver support features are engaged - even if your feet are off the pedals and you are not steering. **You must constantly supervise** these support features: you must steer, brake or accelerate as needed to maintain safety. These features provide steering **AND** brake/acceleration support to the driver. For example: lane centering **AND** adaptive cruise control at the same time) **Level 3** : **You <u>are not</u> driving** when these automated driving features are engaged - even if you are seated in "the driver's seat". When the feature requests **you must drive**. These features can drive the vehicle under limited conditions and will not operate unless all required conditions are met. For example: traffic jam chauffeur.

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	Level 4 : **You <u>are not</u> driving** when these automated driving features are engaged - even if you are seated in "the driver's seat". These automated driving features will not require you to take over driving. These features can drive the vehicle under limited conditions and will not operate unless all required conditions are met. For example: local driverless taxi, pedals/steering wheel may or may not be installed.
What is the brand of your car? Please select all that apply.	See sheet "Car_brand_drop_down"
What are the cubic meters of your vehicle's engine?	[NF 800-8000]
How far is the driving range of this car?	Less than 150 kilometres 150-250 kilometres 250-350 kilometres 350-500 kilometres 500-750 kilometres 750-1000 kilometres Above 1000 kilometres
How old is this car (in terms of registration year)?	0-2 years old 3-5 years old 6-8 years old 9-11 years old 12 years old and above
How about the seat capacity of this car?	Less than 4 seats 4 seats 5 seats

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	6-8 seats
What is the annual vehicle mileage travelled (VMT) of this car?	Below 3,000 km 3,000-4,999 km 5,000-6,999 km 7,000-8,999 km 9,000-10,999 km 11,000-12,999 km 13,000-14,999 km 15,000 km or more
How much is the annual fuel cost?	Less than 600€ 600€-999€ 1000€-1,399€ 1,400€-1,799€ 1,800€ or more
How much is the annual maintenance cost?	Less than 200€ 200€-399€ 400€-599€ 600€-799€ 800€ or more
How much did this car cost you for purchase?	Under 10,000€ 10,000€-19,999€ 20,000€-29,999€ 30,000€-39,999€ 40,000€-59,999€

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	60,000€-79,999€ 80,000€ or more
How far is the average refuel/recharging distance of this car?	15km 25km 50km 75km 100km
How often do you use this vehicle?	Never Once in a fortnight A Couple of times per week 3-4 times a week Once per day Several times per day
Have you subscribed for car sharing services?	No Yes
Where do you usually park the vehicle while at home? Please select all that apply.	On street - resident scheme On street - metered On street - other Off street - public other Off street - private residential Off street - private non- residential
How many motorcycles does your household own?	[NF 0-12]
Have you subscribed for motorcycle sharing services?	No Yes
How many electric-scooter does your household own?	[NF 0-12]

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Have you subscribed for electric-scooter sharing services?	No Yes
How many bicycles does your household own?	[NF 0-12]
Have you subscribed for bike sharing services?	No Yes
Do you use taxi for your trips?	No Yes
Do you use public transports (e.g. bus, tram, train)?	No Yes
Do you have a monthly pass for public transport modes?	Bus Tram Train None above
What is the duration of your public pass?	Weekly Monthly Yearly
What type of area covers your pass?	Urban pass Inter-urban pass
Do you own a smartphone?	No Yes
How would you rate your dependence on using smartphone apps to check travel information (e.g. mode, route, travel time) before and during a trip in the UK/ Italy?	Not at all Slightly Somewhat Moderately Extremely

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What do you mainly use travel apps for? Please check all that apply	I don't use travel apps Planning trips (e.g. check routes, mode, departure time) Navigation Checking other real-time information, e.g. travel time, road congestion Buying mobility services (e.g. buy train tickets through train apps) Contactless payment for mobility services
How many one-way trips did you make in an average week by: **Please note that:** **• One-way trip describes travelling from an origin to a destination, e.g. commuting for work consists of two one-way trips - one there and one home.** **• If more than one method of transport is involved in an one-way trip, please count them separately** **- Bus** **- Tram** **- Train** **- Private car as a driver <only shown to licenced respondents with at least one car>** **- Private car as a passenger <only shown to respondents with at least one car>** **- Taxi** **- Ride-sharing (e.g. Uber)** **- Cycling**	[NF 0-100]

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How do you rate your general satisfaction with travelling by: **- Bus** **- Tram** **- Train** **- Private car as a driver** **- Private car as a passenger <only shown to phhcar>0>** **- Taxi** **- Ride-sharing (e.g. Uber)** **- Cycling**	Extremely dissatisfied Somewhat dissatisfied Neither satisfied not dissatisfied Somewhat satisfied Extremely satisfied
How long is your commute distance (one-way)?	Less than 5 km 5-10 km 10-15 km 15-20 km 20-30 km 30-40 km 40-50 km 50-60 km More than 60 km
How long does it normally take to get to your place of work/education from your home?	Less than 10min 10-20min 20-30min 30-45min 45-60min 1-1.5h

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	Longer than 1.5h
Which mode do you usually use to get to your place of work/education?	Private car as a passenger Private car as a driver Public transport (e.g. bus, tram, local train) Ride-hailing (e.g. Uber) Taxi Bike Walk all the way
How would you describe the area type of your residential location?	City centre Suburban Rural
Do you have any long-term physical or health issue that limits your ability to travel and get around?	Yes No Prefer not to answer
How easy or difficult is to use the below transport modes?	
Bus	Impossible without help Difficult (but not impossible) Easy to use I do not have the experience
Metro	Impossible without help Difficult (but not impossible) Easy to use I do not have the experience

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Car	Impossible without help Difficult (but not impossible) Easy to use I do not have the experience
Taxi	Impossible without help Difficult (but not impossible) Easy to use I do not have the experience
Cycling	Impossible without help Difficult (but not impossible) Easy to use I do not have the experience
Walking	Impossible without help Difficult (but not impossible) Easy to use I do not have the experience
Page 3: attitudes and perceptions	
Attitudes towards automation	
Automated vehicles are exciting Much of society will benefit from a fully automated transport system Automated vehicles can help people feel happier Some complex decisions are best left to automated vehicles instead of human drivers I love everything about AVs	1 = Strongly disagree 2 = Disagree 3 = Neither disagree nor agree" 4 = Agree 5 = Strongly agree

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I would entrust an AV to carry my kids to school (or a dearest person to an activity)	
Autonomous driving can allow me to allocate my time on other activities while driving	
Attitudes regarding COVID and other health issues	
Due to the ongoing/past pandemic I would avoid crowded public transport vehicles I am more worried about my health than most people around me The COVID-19 situation has greatly affected my mental health The COVID-19 situation has greatly affected my physical health I would avoid sharing a vehicle with an unknown person due to health concerns	1 = Strongly disagree 2 = Disagree 3 = Neither disagree nor agree" 4 = Agree 5 = Strongly agree
Attitudes regarding data privacy and concerns	
I am more worried regarding my data rights than I was 5 years ago I suspect my data is being used/exploited without my consent Technology is becoming more "needy" regarding data needs from individuals I am willing to share my private data in order to receive a respectable/needed service I am willing to share my private data in order to support a non-profit/public good initiative I am willing to share my private data for personal profit/gain	1 = Strongly disagree 2 = Disagree 3 = Neither disagree nor agree" 4 = Agree 5 = Strongly agree

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10.2. Passenger survey questionnaire for Oxfordshire (OXS)

Appendix 2: Passenger survey questionnaire for Oxfordshire

Question	Response options - Oxfordshire
Page 1: Socio-economic characteristics	
How old are you?	[NF 18-99]
What is your gender?	Male Female Other Prefer not to answer
In which area do you live	See sheet "National_drop down"
What is the highest degree or level of education you completed?	No formal qualifications GCSEs or equivalent A level or equivalent Vocational school Undergraduate Master's degree Doctorate degree Other
What is your employment status?	Full time paid employment Part-time paid employment Full time self-employment Part time self-employment Student Unemployed and looking for work Unemployed and not looking for work

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	Retired Homekeeper Other
Which of the following best describes your working schedule?	Fixed work schedule Flexible work schedule - with flexibility in finish times only Flexible work schedule - with flexibility in start times only Flexible work schedule - with flexibility in both start and finish times Rotating shift work schedule
Do you always work in the same place or work at multiple locations? (If you both work from home and work on site, please only consider the work performed outside of you home)	No Yes
How many days in an average week do you: **- work from home?** **- travel to work?**	None 1 day 2 days 3 days 4 days 5 days More than 5 days
What is your marital status?	Single Married/Civil partnered Divorced Widowed
Including yourself, how many people live in your household?	[NF 1-12]
Who else lives in your household? Please select all that apply.	Spouse/Partner Parent(s) or parent(s)-in-law Child(ren)

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	Grandchild(ren) Other relative Live-in domestic helper Other non-relative/roommate/housemate Prefer not to answer
How many children do you have?	[NF 1-12]
How many children between the age of 0 to 12, live with you?	[NF 0-12]
How many children between the age of 13 to 18, live with you?	[NF 0-12]
Thinking about all sources of income such as salary/wages, benefits, pensions and so on, which numbers best represent the total annual income of your household before taxes and other deductions?	less than £5,000 £5,000 - £9,999 £10,000 - £14,999 £15,000 - £19,999 £20,000 - £24,999 £25,000 - £34,999 £35,000 - £49,999 £50,000 - £74,999 £75,000 - £99,999 £100,000 or more Prefer not to answer/Don't Know
How many people in your household are employed (including full-time, part-time and self-employed)?	[NF <=hh_size]
How many people in your household are holding valid driving licences?	[NF <=hh_size]
Do you hold any of these types of driving licences? Please check all that apply if licence is currently valid	No (exclusive option) Full licence - car Full licence – motorcycle or scooter
What type of dwelling are you currently living at?	Terrace house

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	Semi-detached house Detached house Bungalow Converted flat Purpose built flat (less than 6 storeys high) Purpose built flat (at least 6 storeys high)
How far are the following places away from your home? **- Nearest bus/tram stop** **- Nearest train station** **- Nearest grocery store** **- Nearest park/green space**	Less than 0.5 mile 0.5-1 mile 1-2 mile 2-3 mile 3-5 mile 5-7 mile 7-10 mile More than 10 miles
Page 2: Travel behaviour information	
How many cars does your household own or has access?	0 1 2 3 3+
Does your household have access to a leased car or company car?	No Yes
Are you the main driver of any of these cars?	No - I do not have regular access to any cars Yes - but I shared a car with other household members

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	Yes
For the vehicle you are the main user, please reply to the follow questions	
What kind of vehicle is it?	Hatchback Estate SUV Saloon Coupe Convertible MPV Pickup
What type of fuel does your vehicle use?	Petrol Diesel Compressed natural gas (CNG) Liquefied petroleum gas (LPG) hybrid Plug-in hybrid Electric Other energy souse (e.g. ethanol, hydrogen)
What is the level of driving automation?	**Level 0** : **You <u>are</u> driving** whenever these driver support features are engaged - even if your feet are off the pedals and you are not steering. **You must constantly supervise** these support features: you must steer, brake or accelerate as needed to maintain safety. These features **are limited** to providing warnings and momentary assistance. For example: automatic emergency braking, blind spot warning, lane departure warning.

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	Level 1 : **You <u>are</u> driving** whenever these driver support features are engaged - even if your feet are off the pedals and you are not steering. **You must constantly supervise** these support features: you must steer, brake or accelerate as needed to maintain safety. These features provide steering **OR** brake/acceleration support to the driver. For example: lane centering **OR** adaptive cruise control. **Level 2** : **You <u>are</u> driving** whenever these driver support features are engaged - even if your feet are off the pedals and you are not steering. **You must constantly supervise** these support features: you must steer, brake or accelerate as needed to maintain safety. These features provide steering **AND** brake/acceleration support to the driver. For example: lane centering **AND** adaptive cruise control at the same time) **Level 3** : **You <u>are not</u> driving** when these automated driving features are engaged - even if you are seated in "the driver's seat". When the feature requests **you must drive**. These features can drive the vehicle under limited conditions and will not operate unless all required conditions are met. For example: traffic jam chauffeur. **Level 4** : **You <u>are not</u> driving** when these automated driving features are engaged - even if you are seated in "the driver's seat". These automated driving features will not require you to take over driving. These features can drive the vehicle under limited conditions and will not operate unless all required conditions are met. For example: local driverless taxi, pedals/steering wheel may or may not be installed.
What is the brand of your car? Please select all that apply.	See sheet "Car_brand_drop_down"
What are the cubic meters of your vehicle's engine?	[NF 800-8000]

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How far is the driving range of this car?	Less than 150 miles 150-250 miles 250-350 miles 350-500 miles 500-750 miles 750-1000 miles Above 1000 miles
How old is this car (in terms of registration year)?	0-2 years old 3-5 years old 6-8 years old 9-11 years old 12 years old and above
How about the seat capacity of this car?	Less than 4 seats 4 seats 5 seats 6-8 seats
What is the annual vehicle mileage travelled (VMT) of this car?	Below 3,000 miles 3,000-4,999 miles 5,000-6,999 miles 7,000-8,999 miles 9,000-10,999 miles 11,000-12,999 miles 13,000-14,999 miles 15,000 miles or more

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How much is the annual fuel cost?	Less than £600 £600-£999 £1000-£1,399 £1,400-£1,799 £1,800 or more
How much is the annual maintance cost?	Less than £200 £200-£399 £400-£599 £600-£799 £800 or more
How much did this car cost you for purchase?	Under £10,000 £10,000-£19,999 £20,000-£29,999 £30,000-£39,999 £40,000-£59,999 £60,000-£79,999 £80,000 or more
How far is the average refuel/recharging distance of this car?	15 miles 25 miles 50 miles 75 miles 100 miles
How often do you use this vehicle?	Never Once in a fortnight

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	A Couple of times per week 3-4 times a week Once per day Several times per day
Where do you usually park the vehicle while at home? Please select all that apply.	On street - resident scheme On street - metered On street - other Off street - public other Off street - private residential Off street - private non- residential
How many motorcycle or scooter does your household own?	[NF 0-12]
How often do you use your motorcycle or scooter for your trips?	Never Once in a fortnight A Couple of times per week 3-4 times a week Once per day Several times per day
How many bicycles does your household own?	[NF 0-12]
Do you use public transports (e.g. bus, tram, train)?	No Yes
Do you have a monthly pass for public transport modes?	Bus Tram Train None above
What is the duration of your public pass?	Weekly Monthly

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	Yearly
Do you own a smartphone?	No Yes
How would you rate your dependence on using smartphone apps to check travel information (e.g. mode, route, travel time) before and during a trip in the UK/ Italy?	Not at all Slightly Somewhat Moderately Extremely
What do you mainly use travel apps for? Please check all that apply	I don't use travel apps Planning trips (e.g. check routes, mode, departure time) Navigation Checking other real-time information, e.g. travel time, road congestion Buying mobility services (e.g. buy train tickets through train apps) Contactless payment for mobility services
How many one-way trips did you make in an average week by: **Please note that:** **• One-way trip describes travelling from an origin to a destination, e.g. commuting for work consists of two one-way trips - one there and one home.** **• If more than one method of transport is involved in an one-way trip, please count them separately** **- Bus** **- Tram** **- Train**	[NF 0-100]

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- Private car as a driver <only shown to licenced respondents with at least one car> **- Private car as a passenger <only shown to respondents with at least one car>** **- Taxi** **- Ride-sharing (e.g. Uber)** **- Cycling**	
How do you rate your general satisfaction with travelling by: **- Bus** **- Tram** **- Train** **- Private car as a driver** **- Private car as a passenger <only shown to phhcar>0>** **- Taxi** **- Ride-sharing (e.g. Uber)** **- Cycling**	Extremely dissatisfied Somewhat dissatisfied Neither satisfied not dissatisfied Somewhat satisfied Extremely satisfied
How long is your commute distance (one-way)?	Less than 5 miles 5-10 miles 10-15 miles 15-20 miles 20-30 miles 30-40 miles 40-50 miles 50-60 miles More than 60 miles
	Less than 10min

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How long does it normally take to get to your place of work/education from your home?	10-20min 20-30min 30-45min 45-60min 1-1.5h Longer than 1.5h
Which mode do you usually use to get to your place of work/education?	Private car as a passenger Private car as a driver Public transport (e.g. bus, tram, local train) Ride-hailing (e.g. Uber) Taxi Bike Walk all the way
How would you describe the area type of your residential location?	City centre Suburban Rural
Do you have any long-term physical or health issue that limits your ability to travel and get around?	Yes No Prefer not to answer
How easy or difficult is to use the below transport modes?	
Bus	Impossible without help Difficult (but not impossible) Easy to use I do not have the experience

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Underground	Impossible without help Difficult (but not impossible) Easy to use I do not have the experience
Car	Impossible without help Difficult (but not impossible) Easy to use I do not have the experience
Taxi	Impossible without help Difficult (but not impossible) Easy to use I do not have the experience
Cycling	Impossible without help Difficult (but not impossible) Easy to use I do not have the experience
Walking	Impossible without help Difficult (but not impossible) Easy to use I do not have the experience
Page 3: attitudes and perceptions	
Attitudes towards automation	
Automated vehicles are exciting Much of society will benefit from a fully automated transport system Automated vehicles can help people feel happier	1 = Strongly disagree 2 = Disagree 3 = Neither disagree nor agree"

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Some complex decisions are best left to automated vehicles instead of human drivers I love everything about AVs I would entrust an AV to carry my kids to school (or a dearest person to an activity) Autonomous driving can allow me to allocate my time on other activities while driving	4 = Agree 5 = Strongly agree
Attitudes regarding COVID and other health issues	
Due to the ongoing/past pandemic I would avoid crowded public transport vehicles I am more worried about my health than most people around me The COVID-19 situation has greatly affected my mental health The COVID-19 situation has greatly affected my physical health I would avoid sharing a vehicle with an unknown person due to health concerns	1 = Strongly disagree 2 = Disagree 3 = Neither disagree nor agree" 4 = Agree 5 = Strongly agree
Attitudes regarding data privacy and concerns	
I am more worried regarding my data rights than I was 5 years ago I suspect my data is being used/exploited without my consent Technology is becoming more "needy" regarding data needs from individuals I am willing to share my private data in order to receive a respectable/needed service I am willing to share my private data in order to support a non-profit/public good initiative	1 = Strongly disagree 2 = Disagree 3 = Neither disagree nor agree" 4 = Agree 5 = Strongly agree

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I am willing to share my private data for personal profit/gain

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10.3. Turin's Sample size with confidence level 86% & 87%

Appendix 3: Turin's Sample size with confidence level 86% & 87%.

Confidence level 86%					Confidence level 87%				
year 2011 - Name municipality	Sample size	Sample for No cars or vans in household	Sample for 1 car or van in household	Sample for 2 cars or vans in household	year 2011 - Name municipality	Sample size	Sample for No cars or vans in household	Sample for 1 car or van in household	Sample for 2 cars or vans in household
Airasca	4	1	2	1	Airasca	4	1	2	1
Almese	6	1	3	2	Almese	7	1	3	3
Alpignano	17	3	8	6	Alpignano	19	3	9	7
Avigliana	12	2	5	4	Avigliana	13	2	6	5
Baldissero Torinese	4	1	2	1	Baldissero Torinese	4	1	2	2
Beinasco	18	3	8	7	Beinasco	20	3	9	7
Borgaro Torinese	13	2	6	5	Borgaro Torinese	14	2	6	5
Bosconero	3	0	1	1	Bosconero	3	1	1	1
Brandizzo	8	1	4	3	Brandizzo	9	2	4	3
Bruino	8	1	4	3	Bruino	9	1	4	3
Buttigliera Alta	6	1	3	2	Buttigliera Alta	7	1	3	3
Cafasse	4	1	2	1	Cafasse	4	1	2	1
Cambiano	6	1	3	2	Cambiano	6	1	3	2
Candiolo	5	1	2	2	Candiolo	6	1	3	2
Cantalupa	2	0	1	1	Cantalupa	3	0	1	1
Caprie	2	0	1	1	Caprie	2	0	1	1
Carignano	9	2	4	3	Carignano	10	2	5	4
Casalborgone	2	0	1	1	Casalborgone	2	0	1	1

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Caselette	3	0	1	1	Caselette	3	1	1	1
Caselle Torinese	17	3	8	6	Caselle Torinese	19	3	9	7
Castagneto Po	2	0	1	1	Castagneto Po	2	0	1	1
Castagnole Piemonte	2	0	1	1	Castagnole Piemonte	2	0	1	1
Castiglione Torinese	6	1	3	2	Castiglione Torinese	7	1	3	2
Chieri	37	6	17	14	Chieri	40	7	18	15
Chivasso	26	5	12	10	Chivasso	29	5	13	11
Cinzano	0	0	0	0	Cinzano	0	0	0	0
Collegno	51	9	23	19	Collegno	56	10	25	21
Cumiana	8	1	4	3	Cumiana	9	2	4	3
Druento	8	1	4	3	Druento	9	2	4	3
Fiano	3	0	1	1	Fiano	3	1	1	1
Foglizzo	2	0	1	1	Foglizzo	3	0	1	1
Front	2	0	1	1	Front	2	0	1	1
Gassino Torinese	10	2	4	4	Gassino Torinese	11	2	5	4
Givoletto	3	1	2	1	Givoletto	4	1	2	1
Grugliasco	37	6	17	14	Grugliasco	41	7	19	15
La Cassa	2	0	1	1	La Cassa	2	0	1	1
La Loggia	8	1	4	3	La Loggia	9	2	4	3
Lauriano	2	0	1	1	Lauriano	2	0	1	1
Leini	15	3	7	5	Leini	16	3	7	6
Lombardore	2	0	1	1	Lombardore	2	0	1	1
Marentino	1	0	1	0	Marentino	1	0	1	1
Moncalieri	58	10	26	21	Moncalieri	64	11	29	24
Montaldo Torinese	1	0	0	0	Montaldo Torinese	1	0	0	0

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Montanaro	5	1	2	2	Montanaro	6	1	3	2
Monteu da Po	1	0	0	0	Monteu da Po	1	0	0	0
Nichelino	46	8	21	17	Nichelino	51	9	23	19
None	8	1	3	3	None	8	1	4	3
Orbassano	22	4	10	8	Orbassano	25	4	11	9
Pavarolo	1	0	0	0	Pavarolo	1	0	1	0
Pecetto Torinese	4	1	2	1	Pecetto Torinese	4	1	2	2
Pianezza	14	2	6	5	Pianezza	15	3	7	6
Pino Torinese	9	1	4	3	Pino Torinese	9	2	4	4
Piobesi Torinese	3	1	2	1	Piobesi Torinese	4	1	2	1
Piossasco	18	3	8	7	Piossasco	19	3	9	7
Reano	2	0	1	1	Reano	2	0	1	1
Rivalba	1	0	0	0	Rivalba	1	0	1	0
Rivalta di Torino	18	3	8	7	Rivalta di Torino	20	4	9	8
Rivarossa	2	0	1	1	Rivarossa	2	0	1	1
Rivoli	49	8	22	18	Rivoli	54	9	25	20
Robassomero	3	0	1	1	Robassomero	3	1	1	1
Rosta	4	1	2	2	Rosta	5	1	2	2
Rubiana	3	0	1	1	Rubiana	3	1	1	1
San Benigno Canavese	5	1	2	2	San Benigno Canavese	6	1	3	2
San Francesco al Campo	5	1	2	2	San Francesco al Campo	5	1	2	2
San Gillio	3	0	1	1	San Gillio	3	1	1	1
San Maurizio Canavese	9	2	4	3	San Maurizio Canavese	10	2	5	4
San Mauro Torinese	19	3	9	7	San Mauro Torinese	21	4	9	8
San Raffaele Cimena	3	1	1	1	San Raffaele Cimena	4	1	2	1

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San Sebastiano da Po	2	0	1	1	San Sebastiano da Po	2	0	1	1
Sangano	4	1	2	1	Sangano	4	1	2	1
Sciolze	2	0	1	1	Sciolze	2	0	1	1
Settimo Torinese	46	8	21	17	Settimo Torinese	51	9	23	19
Torino	972	306	476	190	Torino	1071	337	525	210
Torrazza Piemonte	3	0	1	1	Torrazza Piemonte	3	1	1	1
Trana	4	1	2	1	Trana	4	1	2	2
Trofarello	11	2	5	4	Trofarello	12	2	5	4
Val della Torre	4	1	2	1	Val della Torre	4	1	2	2
Vallo Torinese	1	0	0	0	Vallo Torinese	1	0	0	0
Varisella	1	0	0	0	Varisella	1	0	0	0
Venaria Reale	33	6	15	12	Venaria Reale	36	6	17	14
Verolengo	5	1	2	2	Verolengo	6	1	3	2
Villar Dora	3	1	1	1	Villar Dora	3	1	1	1
Villarbasse	3	1	1	1	Villarbasse	4	1	2	1
Villastellone	5	1	2	2	Villastellone	5	1	2	2
Vinovo	14	2	6	5	Vinovo	15	3	7	6
Virle Piemonte	1	0	1	0	Virle Piemonte	1	0	1	0
Volpiano	14	2	6	5	Volpiano	15	3	7	6
Volvera	8	1	4	3	Volvera	9	1	4	3
Total	1824	453	864	506	**Total**	2010	499	953	558

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10.4. Oxfordshire's Sample size with confidence level 93%.

Appendix 4: Oxfordshire's Sample size with confidence level 93%.

Confidence level 93%									
2011 super output area - lower layer		Sample size	Sample for No cars or vans in household	Sample for 1 car or van in household	Sample for 2 cars or vans in household	Sample for 3 cars or vans in household	Sample for 4 or more cars or vans in household	Males	Females
Cherwell 001A	E01028479	3	0	1	2	0	0	50%	50%
Cherwell 001B	E01028480	4	0	1	1	0	0	49%	51%
Cherwell 001C	E01028508	3	0	1	1	0	0	48%	52%
Cherwell 001D	E01028509	4	0	1	2	0	0	50%	50%
Cherwell 002A	E01028441	6	1	3	2	0	0	49%	51%
Cherwell 002C	E01028443	4	0	2	1	0	0	49%	51%
Cherwell 002D	E01028444	4	0	2	1	0	0	50%	50%
Cherwell 002E	E01032943	4	0	2	2	0	0	49%	51%
Cherwell 002F	E01032944	4	1	2	1	0	0	51%	49%
Cherwell 003A	E01028445	3	1	1	1	0	0	47%	53%
Cherwell 003B	E01028446	4	1	2	1	0	0	49%	51%
Cherwell 003C	E01028447	3	1	2	1	0	0	52%	48%
Cherwell 003D	E01028448	4	2	2	1	0	0	48%	52%
Cherwell 004A	E01028435	6	3	2	0	0	0	48%	52%
Cherwell 004C	E01028437	4	0	2	1	0	0	49%	51%
Cherwell 004D	E01028438	5	1	2	1	0	0	50%	50%
Cherwell 004E	E01028439	4	0	2	1	0	0	50%	50%
Cherwell 004F	E01028440	5	2	2	1	0	0	51%	49%
Cherwell 004G	E01032941	4	2	2	1	0	0	47%	53%
Cherwell 004H	E01032942	4	1	2	1	0	0	50%	50%

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Cherwell 005A	E01028449	3	1	1	1	0	0	50%	50%
Cherwell 005B	E01028450	3	1	1	1	0	0	46%	54%
Cherwell 005C	E01028451	3	1	1	1	0	0	52%	48%
Cherwell 005D	E01028452	3	1	1	1	0	0	49%	51%
Cherwell 005E	E01028453	3	1	1	1	0	0	48%	52%
Cherwell 005F	E01028454	4	1	2	1	0	0	48%	52%
Cherwell 006A	E01028430	4	1	2	1	0	0	50%	50%
Cherwell 006B	E01028431	4	1	2	1	0	0	48%	52%
Cherwell 006C	E01028432	4	1	2	1	0	0	47%	53%
Cherwell 006D	E01028433	5	1	2	1	0	0	47%	53%
Cherwell 006E	E01028434	3	0	1	1	0	0	43%	57%
Cherwell 007A	E01028426	3	0	2	1	0	0	49%	51%
Cherwell 007B	E01028427	4	1	2	1	0	0	51%	49%
Cherwell 007C	E01028428	3	0	1	1	0	0	49%	51%
Cherwell 007D	E01028429	3	1	1	1	0	0	46%	54%
Cherwell 008A	E01028422	4	0	1	2	0	0	49%	51%
Cherwell 008B	E01028423	4	0	1	2	0	0	46%	54%
Cherwell 008C	E01028475	5	1	2	2	0	0	49%	51%
Cherwell 008D	E01028476	5	0	2	2	1	0	50%	50%
Cherwell 009A	E01028474	4	0	2	2	0	0	50%	50%
Cherwell 009B	E01028485	3	0	1	1	0	0	47%	53%
Cherwell 009C	E01028486	3	0	1	1	0	0	49%	51%
Cherwell 009D	E01028503	3	0	1	1	0	0	48%	52%
Cherwell 009E	E01028504	4	0	1	2	0	0	51%	49%
Cherwell 010A	E01028481	4	1	1	1	0	0	48%	52%
Cherwell 010B	E01028482	3	0	1	1	0	0	48%	52%
Cherwell 010C	E01028505	4	0	2	2	0	0	49%	51%
Cherwell 010D	E01028506	4	0	1	2	0	0	48%	52%

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Cherwell 010E	E01028507	4	0	1	2	1	0	50%	50%
Cherwell 011A	E01028425	4	0	2	2	0	0	56%	44%
Cherwell 011B	E01028477	4	0	1	2	1	0	48%	52%
Cherwell 011C	E01028478	3	0	1	2	0	0	49%	51%
Cherwell 011D	E01028483	3	0	1	1	0	0	50%	50%
Cherwell 011E	E01028484	3	0	1	1	0	0	49%	51%
Cherwell 011F	E01028499	4	0	1	2	0	0	49%	51%
Cherwell 012A	E01028459	4	0	2	1	0	0	50%	50%
Cherwell 012B	E01028460	5	0	1	2	0	0	50%	50%
Cherwell 012C	E01028461	4	0	2	2	0	0	47%	53%
Cherwell 012D	E01028462	4	1	2	1	0	0	50%	50%
Cherwell 013A	E01028455	3	0	1	1	0	0	50%	50%
Cherwell 013B	E01028456	4	1	2	1	0	0	50%	50%
Cherwell 013C	E01028457	3	0	1	1	0	0	51%	49%
Cherwell 013D	E01028458	4	1	2	1	0	0	50%	50%
Cherwell 013E	E01028467	4	1	2	1	0	0	47%	53%
Cherwell 014A	E01028466	4	1	2	1	0	0	49%	51%
Cherwell 014B	E01028469	4	0	2	1	0	0	48%	52%
Cherwell 014C	E01028470	4	1	2	1	0	0	50%	50%
Cherwell 014D	E01028471	3	1	1	1	0	0	48%	52%
Cherwell 014E	E01028472	3	0	1	1	0	0	51%	49%
Cherwell 014F	E01028473	4	0	2	1	0	0	48%	52%
Cherwell 015A	E01028463	6	1	3	2	0	0	50%	50%
Cherwell 015B	E01028464	4	0	2	1	0	0	50%	50%
Cherwell 015C	E01028465	3	0	1	1	0	0	49%	51%
Cherwell 015D	E01028468	6	2	2	1	0	0	49%	51%
Cherwell 016A	E01028424	4	0	1	2	1	0	52%	48%
Cherwell 016B	E01028497	4	0	1	2	0	0	49%	51%

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Cherwell 016C	E01028498	4	0	2	1	0	0	50%	50%
Cherwell 016D	E01028500	3	0	1	1	0	0	70%	30%
Cherwell 016E	E01028501	3	0	1	1	0	0	49%	51%
Cherwell 016F	E01028502	3	0	1	1	0	0	49%	51%
Cherwell 017A	E01028487	3	0	2	1	0	0	48%	52%
Cherwell 017B	E01028489	4	0	2	1	0	0	49%	51%
Cherwell 017C	E01028490	3	1	1	1	0	0	49%	51%
Cherwell 017D	E01028491	4	1	2	1	0	0	49%	51%
Cherwell 017E	E01028494	3	1	1	1	0	0	49%	51%
Cherwell 018A	E01028492	4	1	2	1	0	0	50%	50%
Cherwell 018B	E01028493	3	1	1	1	0	0	48%	52%
Cherwell 018C	E01028495	3	1	1	1	0	0	49%	51%
Cherwell 018D	E01028496	3	0	1	1	0	0	47%	53%
Cherwell 019A	E01028488	4	1	2	1	0	0	57%	43%
Cherwell 019B	E01028510	4	0	2	2	0	0	50%	50%
Cherwell 019C	E01028511	4	1	2	1	0	0	49%	51%
Cherwell 019D	E01028512	4	0	2	1	0	0	46%	54%
Oxford 001A	E01028594	4	1	2	1	0	0	47%	53%
Oxford 001B	E01028595	4	1	2	1	0	0	47%	53%
Oxford 001C	E01028596	4	1	2	1	0	0	47%	53%
Oxford 001D	E01028597	4	1	2	1	0	0	49%	51%
Oxford 002C	E01028591	3	1	2	1	0	0	54%	46%
Oxford 002D	E01028592	3	1	1	1	0	0	53%	47%
Oxford 002F	E01032554	6	2	3	1	0	0	46%	54%
Oxford 002G	E01032555	5	2	2	1	0	0	48%	52%
Oxford 003A	E01028565	3	1	2	1	0	0	49%	51%
Oxford 003B	E01028583	3	1	1	0	0	0	46%	54%
Oxford 003C	E01028584	7	1	4	1	0	0	49%	51%

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Oxford 003D	E01028585	2	1	1	0	0	0	51%	49%
Oxford 004A	E01028560	4	1	2	1	0	0	48%	52%
Oxford 004B	E01028561	4	1	2	1	0	0	47%	53%
Oxford 004C	E01028562	4	1	2	1	0	0	47%	53%
Oxford 004D	E01028563	4	1	2	1	0	0	49%	51%
Oxford 005A	E01028513	6	2	2	1	0	0	47%	53%
Oxford 005B	E01028514	3	1	2	0	0	0	48%	52%
Oxford 005C	E01028516	4	1	2	1	0	0	48%	52%
Oxford 005D	E01028538	4	1	2	1	0	0	48%	52%
Oxford 006A	E01028534	3	1	1	1	0	0	47%	53%
Oxford 006B	E01028535	4	1	2	1	0	0	47%	53%
Oxford 006C	E01028536	4	1	2	1	0	0	44%	56%
Oxford 006D	E01028537	5	2	2	1	0	0	45%	55%
Oxford 006E	E01028539	4	1	2	1	0	0	52%	48%
Oxford 006F	E01028540	3	1	2	1	0	0	45%	55%
Oxford 007A	E01028515	4	1	2	1	0	0	48%	52%
Oxford 007B	E01028571	4	1	2	1	0	0	48%	52%
Oxford 007C	E01028572	4	1	2	1	0	0	49%	51%
Oxford 007D	E01028573	4	1	2	1	0	0	48%	52%
Oxford 007E	E01028574	4	1	2	1	0	0	48%	52%
Oxford 008A	E01028521	4	2	1	0	0	0	57%	43%
Oxford 008B	E01028522	5	3	1	0	0	0	58%	42%
Oxford 008E	E01033282	8	3	4	1	0	0	51%	49%
Oxford 009A	E01028548	5	2	2	1	0	0	51%	49%
Oxford 009B	E01028549	5	2	2	1	0	0	53%	47%
Oxford 009C	E01028550	4	2	2	0	0	0	50%	50%
Oxford 009D	E01028551	4	2	2	0	0	0	53%	47%
Oxford 010A	E01028523	4	2	2	1	0	0	47%	53%

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Oxford 010B	E01028524	4	2	1	0	0	0	49%	51%
Oxford 010C	E01028525	4	2	2	1	0	0	47%	53%
Oxford 010D	E01028526	3	1	1	0	0	0	48%	52%
Oxford 011A	E01028579	3	1	1	0	0	0	46%	54%
Oxford 011B	E01028580	4	2	1	0	0	0	52%	48%
Oxford 011C	E01028581	3	1	1	1	0	0	49%	51%
Oxford 011D	E01028582	4	2	1	0	0	0	49%	51%
Oxford 011E	E01028586	4	2	2	0	0	0	50%	50%
Oxford 011F	E01028587	5	2	2	0	0	0	50%	50%
Oxford 011G	E01028588	3	1	1	0	0	0	52%	48%
Oxford 012A	E01028541	4	1	2	0	0	0	47%	53%
Oxford 012B	E01028542	5	1	2	1	0	0	52%	48%
Oxford 012C	E01028543	4	2	2	0	0	0	53%	47%
Oxford 012D	E01028544	4	2	2	0	0	0	50%	50%
Oxford 013A	E01028531	5	2	3	1	0	0	50%	50%
Oxford 013B	E01028532	6	2	3	1	0	0	51%	49%
Oxford 013C	E01028533	5	2	2	1	0	0	50%	50%
Oxford 013D	E01028556	4	1	2	1	0	0	49%	51%
Oxford 013E	E01028557	4	1	2	1	0	0	47%	53%
Oxford 013F	E01028558	4	1	2	1	0	0	52%	48%
Oxford 013G	E01028559	4	1	2	1	0	0	52%	48%
Oxford 014A	E01028545	4	1	2	1	0	0	48%	52%
Oxford 014B	E01028546	5	2	2	1	0	0	50%	50%
Oxford 014C	E01028547	5	2	2	1	0	0	51%	49%
Oxford 015A	E01028527	4	1	2	1	0	0	49%	51%
Oxford 015B	E01028528	3	1	2	1	0	0	52%	48%
Oxford 015C	E01028529	4	2	1	0	0	0	49%	51%
Oxford 015D	E01028530	4	1	2	1	0	0	50%	50%

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Oxford 015E	E01028575	4	1	2	1	0	0	49%	51%
Oxford 015F	E01028578	4	1	2	1	0	0	50%	50%
Oxford 016A	E01028552	5	2	2	1	0	0	48%	52%
Oxford 016B	E01028553	5	1	2	1	0	0	51%	49%
Oxford 016C	E01028554	3	1	2	1	0	0	49%	51%
Oxford 016D	E01028555	4	1	2	1	0	0	50%	50%
Oxford 016E	E01028576	3	1	1	0	0	0	49%	51%
Oxford 016F	E01028577	5	2	2	1	0	0	49%	51%
Oxford 017A	E01028517	3	1	1	1	0	0	48%	52%
Oxford 017B	E01028518	4	2	2	0	0	0	48%	52%
Oxford 017C	E01028519	3	1	2	0	0	0	49%	51%
Oxford 017D	E01028567	4	1	2	1	0	0	48%	52%
Oxford 018A	E01028520	4	2	1	0	0	0	50%	50%
Oxford 018B	E01028568	4	2	2	0	0	0	45%	55%
Oxford 018C	E01028569	4	2	2	1	0	0	44%	56%
Oxford 018D	E01028570	5	1	3	1	0	0	48%	52%
South Oxfordshire 001A	E01028666	4	1	2	1	0	0	48%	52%
South Oxfordshire 001B	E01028667	3	0	1	1	0	0	49%	51%
South Oxfordshire 001C	E01028668	3	0	1	1	0	0	49%	51%
South Oxfordshire 001D	E01028669	3	0	1	1	0	0	48%	52%
South Oxfordshire 002A	E01028638	3	0	1	1	0	0	50%	50%
South Oxfordshire 002B	E01028639	3	0	1	1	0	0	49%	51%
South Oxfordshire 002C	E01028640	4	0	1	1	0	0	50%	50%
South Oxfordshire 002D	E01028683	4	0	1	1	0	0	50%	50%
South Oxfordshire 003A	E01028670	3	0	1	1	0	0	48%	52%
South Oxfordshire 003B	E01028671	4	1	2	1	0	0	49%	51%
South Oxfordshire 003C	E01028672	4	0	2	2	0	0	49%	51%
South Oxfordshire 003D	E01028673	3	0	1	1	0	0	46%	54%

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South Oxfordshire 004A	E01028646	3	0	1	1	0	0	49%	51%
South Oxfordshire 004B	E01028647	4	0	1	2	0	0	48%	52%
South Oxfordshire 004C	E01028681	3	0	1	1	0	0	50%	50%
South Oxfordshire 004D	E01028682	3	0	1	1	0	0	48%	52%
South Oxfordshire 004E	E01028684	4	0	2	1	0	0	48%	52%
South Oxfordshire 005A	E01028598	6	0	2	2	1	1	50%	50%
South Oxfordshire 005B	E01028613	3	0	1	2	0	0	49%	51%
South Oxfordshire 005C	E01028614	4	0	1	2	0	0	49%	51%
South Oxfordshire 005D	E01028615	4	0	1	2	1	0	48%	52%
South Oxfordshire 005E	E01028616	3	0	1	1	0	0	48%	52%
South Oxfordshire 006A	E01028604	3	1	1	1	0	0	50%	50%
South Oxfordshire 006B	E01028605	4	1	2	1	0	0	49%	51%
South Oxfordshire 006C	E01028607	3	0	1	1	0	0	48%	52%
South Oxfordshire 006D	E01028641	3	0	1	1	0	0	48%	52%
South Oxfordshire 006E	E01028657	3	0	2	1	0	0	50%	50%
South Oxfordshire 006F	E01028658	3	0	1	1	0	0	49%	51%
South Oxfordshire 007A	E01028600	4	0	1	1	0	0	50%	50%
South Oxfordshire 007B	E01028603	3	0	1	1	0	0	50%	50%
South Oxfordshire 007C	E01028606	5	0	2	2	1	0	49%	51%
South Oxfordshire 007D	E01028609	3	0	1	1	0	0	50%	50%
South Oxfordshire 007E	E01028610	4	0	1	1	0	0	50%	50%
South Oxfordshire 008A	E01028678	4	0	1	2	0	0	49%	51%
South Oxfordshire 008B	E01028679	5	0	2	2	1	0	48%	52%
South Oxfordshire 008C	E01028680	5	1	2	2	0	0	46%	54%
South Oxfordshire 009A	E01028625	5	0	2	2	0	0	50%	50%
South Oxfordshire 009B	E01028626	4	0	2	2	0	0	51%	49%
South Oxfordshire 009C	E01028627	4	0	2	1	0	0	48%	52%
South Oxfordshire 009D	E01028628	3	0	1	1	0	0	51%	49%

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South Oxfordshire 009E	E01028629	4	0	2	1	0	0	49%	51%
South Oxfordshire 010A	E01028621	3	1	1	1	0	0	51%	49%
South Oxfordshire 010B	E01028622	3	1	1	1	0	0	48%	52%
South Oxfordshire 010C	E01028623	4	1	2	1	0	0	49%	51%
South Oxfordshire 010D	E01028624	4	1	1	1	0	0	48%	52%
South Oxfordshire 011A	E01028599	4	0	1	2	0	0	47%	53%
South Oxfordshire 011B	E01028601	3	0	1	1	0	0	62%	38%
South Oxfordshire 011C	E01028602	3	0	2	1	0	0	50%	50%
South Oxfordshire 011D	E01028620	6	0	2	2	1	0	55%	45%
South Oxfordshire 012A	E01028608	3	0	1	1	0	0	49%	51%
South Oxfordshire 012B	E01028617	5	1	2	2	0	0	46%	54%
South Oxfordshire 012C	E01028674	3	0	1	1	0	0	49%	51%
South Oxfordshire 012D	E01028675	3	1	1	1	0	0	49%	51%
South Oxfordshire 012E	E01028676	5	1	2	1	0	0	48%	52%
South Oxfordshire 012F	E01028677	5	1	2	1	0	0	48%	52%
South Oxfordshire 013A	E01028630	4	1	2	1	0	0	54%	46%
South Oxfordshire 013B	E01028631	3	1	1	1	0	0	50%	50%
South Oxfordshire 013C	E01028632	3	1	1	1	0	0	49%	51%
South Oxfordshire 013D	E01028633	4	1	2	1	0	0	51%	49%
South Oxfordshire 014A	E01028634	3	0	1	1	0	0	49%	51%
South Oxfordshire 014B	E01028635	4	1	2	1	0	0	50%	50%
South Oxfordshire 014C	E01028636	4	1	1	1	0	0	45%	55%
South Oxfordshire 014D	E01028637	4	0	1	1	0	0	50%	50%
South Oxfordshire 015A	E01028618	4	0	2	2	0	0	51%	49%
South Oxfordshire 015B	E01028619	5	1	2	2	0	0	49%	51%
South Oxfordshire 015C	E01028644	4	1	2	2	0	0	49%	51%
South Oxfordshire 015D	E01028648	3	0	1	1	0	0	50%	50%
South Oxfordshire 015E	E01028649	4	0	1	1	1	0	49%	51%

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South Oxfordshire 016A	E01028650	5	1	2	2	0	0	46%	54%
South Oxfordshire 016B	E01028651	5	1	2	1	0	0	47%	53%
South Oxfordshire 016C	E01028652	6	1	3	2	0	0	44%	56%
South Oxfordshire 017A	E01028653	4	1	2	1	0	0	48%	52%
South Oxfordshire 017B	E01028654	4	1	1	1	0	0	49%	51%
South Oxfordshire 017C	E01028655	5	1	3	1	0	0	45%	55%
South Oxfordshire 017D	E01028656	3	0	1	1	0	0	48%	52%
South Oxfordshire 018A	E01028611	3	0	1	1	0	0	49%	51%
South Oxfordshire 018B	E01028642	3	0	1	1	0	0	48%	52%
South Oxfordshire 018C	E01028643	3	0	1	2	0	0	48%	52%
South Oxfordshire 018D	E01028645	4	0	2	1	0	0	47%	53%
South Oxfordshire 018E	E01028685	3	0	1	1	0	0	48%	52%
South Oxfordshire 018F	E01028686	3	0	1	1	0	0	57%	43%
South Oxfordshire 019A	E01028612	3	0	1	1	0	0	47%	53%
South Oxfordshire 019B	E01028660	4	0	1	2	1	0	50%	50%
South Oxfordshire 019C	E01028661	4	0	1	2	1	0	54%	46%
South Oxfordshire 019D	E01028662	3	0	1	1	1	0	47%	53%
South Oxfordshire 020A	E01028659	4	0	1	2	1	0	52%	48%
South Oxfordshire 020B	E01028663	4	1	1	1	0	0	47%	53%
South Oxfordshire 020C	E01028664	3	0	1	1	0	0	47%	53%
South Oxfordshire 020D	E01028665	3	0	1	1	0	0	47%	53%
Vale of White Horse 001A	E01028708	5	1	2	1	0	0	47%	53%
Vale of White Horse 001B	E01028709	4	0	2	1	0	0	49%	51%
Vale of White Horse 001C	E01028710	4	0	2	2	0	0	50%	50%
Vale of White Horse 001D	E01028711	4	1	1	2	1	0	49%	51%
Vale of White Horse 002A	E01028733	3	0	1	1	0	0	49%	51%
Vale of White Horse 002B	E01028734	4	1	2	1	0	0	49%	51%
Vale of White Horse 002C	E01028735	4	1	2	1	0	0	51%	49%

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Vale of White Horse 002D	E01028740	4	1	2	1	0	0	51%	49%
Vale of White Horse 002E	E01028741	3	0	1	1	0	0	48%	52%
Vale of White Horse 002F	E01028742	5	1	2	1	0	0	49%	51%
Vale of White Horse 003A	E01028738	3	0	2	1	0	0	62%	38%
Vale of White Horse 003B	E01028739	4	1	1	2	0	0	54%	46%
Vale of White Horse 003C	E01028743	3	1	2	1	0	0	70%	30%
Vale of White Horse 003D	E01028744	3	0	1	1	0	0	49%	51%
Vale of White Horse 003E	E01028750	4	1	2	1	0	0	49%	51%
Vale of White Horse 003F	E01028751	4	0	1	2	1	0	48%	52%
Vale of White Horse 003G	E01028752	4	0	1	2	0	0	49%	51%
Vale of White Horse 004A	E01028693	4	0	1	2	0	0	50%	50%
Vale of White Horse 004B	E01028694	4	0	2	1	0	0	51%	49%
Vale of White Horse 004C	E01028701	4	1	2	1	0	0	49%	51%
Vale of White Horse 004D	E01028705	3	0	1	1	0	0	49%	51%
Vale of White Horse 004E	E01028706	4	0	2	1	0	0	51%	49%
Vale of White Horse 004F	E01028707	4	0	2	2	0	0	49%	51%
Vale of White Horse 005A	E01028688	3	0	2	1	0	0	50%	50%
Vale of White Horse 005B	E01028689	4	1	2	1	0	0	50%	50%
Vale of White Horse 005C	E01028695	4	0	2	1	0	0	50%	50%
Vale of White Horse 005D	E01028699	4	0	2	2	0	0	51%	49%
Vale of White Horse 006B	E01028696	3	0	1	1	0	0	52%	48%
Vale of White Horse 006C	E01028697	4	1	2	1	0	0	47%	53%
Vale of White Horse 006D	E01028698	4	1	2	1	0	0	48%	52%
Vale of White Horse 006E	E01028700	4	1	2	1	0	0	48%	52%
Vale of White Horse 006F	E01028703	5	1	2	1	0	0	46%	54%
Vale of White Horse 006G	E01033305	4	1	2	1	0	0	48%	52%
Vale of White Horse 006H	E01033306	5	2	2	1	0	0	48%	52%
Vale of White Horse 007A	E01028726	6	0	2	3	1	0	50%	50%

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Vale of White Horse 007B	E01028736	6	0	2	3	1	0	49%	51%
Vale of White Horse 007C	E01028737	6	0	2	3	1	0	49%	51%
Vale of White Horse 008A	E01028690	4	1	2	1	0	0	51%	49%
Vale of White Horse 008B	E01028691	4	1	2	1	0	0	48%	52%
Vale of White Horse 008C	E01028692	3	1	1	1	0	0	48%	52%
Vale of White Horse 008D	E01028702	3	0	1	1	0	0	48%	52%
Vale of White Horse 008E	E01028704	5	1	2	1	0	0	47%	53%
Vale of White Horse 009A	E01028716	5	0	2	2	0	0	50%	50%
Vale of White Horse 009B	E01028717	5	1	2	1	0	0	47%	53%
Vale of White Horse 009C	E01028718	4	1	2	1	0	0	48%	52%
Vale of White Horse 009D	E01028719	4	0	2	2	0	0	49%	51%
Vale of White Horse 009E	E01028749	6	0	2	2	1	0	50%	50%
Vale of White Horse 010A	E01028714	6	1	2	2	1	0	49%	51%
Vale of White Horse 010B	E01028731	3	0	1	1	0	0	49%	51%
Vale of White Horse 010C	E01028732	3	0	1	1	0	0	50%	50%
Vale of White Horse 010D	E01028753	4	1	1	1	0	0	48%	52%
Vale of White Horse 010E	E01028754	4	0	1	1	0	0	48%	52%
Vale of White Horse 011A	E01028721	3	0	1	1	0	0	51%	49%
Vale of White Horse 011B	E01028722	4	0	2	1	0	0	50%	50%
Vale of White Horse 011C	E01028723	4	1	1	1	0	0	51%	49%
Vale of White Horse 011D	E01028724	3	0	1	1	0	0	51%	49%
Vale of White Horse 011E	E01028725	4	1	2	1	0	0	51%	49%
Vale of White Horse 014A	E01028755	4	1	2	1	0	0	49%	51%
Vale of White Horse 014B	E01028756	7	1	4	2	0	0	47%	53%
Vale of White Horse 014C	E01028758	4	0	1	1	0	0	49%	51%
Vale of White Horse 014D	E01028759	4	1	2	1	0	0	51%	49%
Vale of White Horse 014E	E01028760	3	0	1	1	0	0	48%	52%
Vale of White Horse 014F	E01028761	3	0	1	1	0	0	49%	51%

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Vale of White Horse 015A	E01028712	5	0	2	2	1	0	48%	52%
Vale of White Horse 015B	E01028727	4	0	1	2	1	0	48%	52%
Vale of White Horse 015C	E01028728	3	0	1	1	0	0	46%	54%
Vale of White Horse 015D	E01028729	3	0	1	1	0	0	50%	50%
Vale of White Horse 015E	E01028730	4	0	1	2	1	0	50%	50%
Vale of White Horse 015F	E01028757	4	1	2	1	0	0	46%	54%
Vale of White Horse 016E	E01028713	6	0	2	3	1	0	50%	50%
Vale of White Horse 016F	E01028715	3	0	1	2	0	0	49%	51%
Vale of White Horse 016G	E01028720	6	1	2	2	1	0	49%	51%
Vale of White Horse 016A	E01028745	3	0	1	1	0	0	51%	49%
Vale of White Horse 016B	E01028746	3	0	1	1	0	0	50%	50%
Vale of White Horse 016C	E01028747	3	0	1	1	0	0	52%	48%
Vale of White Horse 016D	E01028748	3	0	1	1	0	0	50%	50%
West Oxfordshire 001A	E01028780	6	1	3	2	0	0	50%	50%
West Oxfordshire 001B	E01028781	3	1	1	1	0	0	47%	53%
West Oxfordshire 001C	E01028782	4	1	2	1	0	0	48%	52%
West Oxfordshire 001D	E01028783	5	1	2	1	0	0	47%	53%
West Oxfordshire 002A	E01028795	4	0	1	2	0	0	48%	52%
West Oxfordshire 002B	E01028796	3	0	1	1	0	0	51%	49%
West Oxfordshire 002C	E01028797	3	0	1	1	0	0	49%	51%
West Oxfordshire 002D	E01028806	5	0	2	2	1	0	47%	53%
West Oxfordshire 003A	E01028763	5	0	2	2	0	0	47%	53%
West Oxfordshire 003B	E01028776	5	0	2	2	1	0	49%	51%
West Oxfordshire 003C	E01028798	5	0	2	2	1	0	49%	51%
West Oxfordshire 004B	E01028804	3	0	1	1	0	0	50%	50%
West Oxfordshire 004D	E01028823	4	1	2	1	0	0	45%	55%
West Oxfordshire 004E	E01028824	4	1	2	1	0	0	47%	53%
West Oxfordshire 004F	E01028825	3	0	1	1	0	0	48%	52%

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West Oxfordshire 004G	E01032954	7	1	3	3	1	0	48%	52%
West Oxfordshire 005A	E01028777	3	0	2	1	0	0	47%	53%
West Oxfordshire 005B	E01028778	4	1	2	1	0	0	49%	51%
West Oxfordshire 005C	E01028779	3	0	1	1	0	0	52%	48%
West Oxfordshire 005D	E01028799	5	0	2	2	1	0	49%	51%
West Oxfordshire 006A	E01028788	4	1	2	1	0	0	48%	52%
West Oxfordshire 006B	E01028789	4	0	1	1	0	0	47%	53%
West Oxfordshire 006C	E01028790	3	0	1	1	0	0	51%	49%
West Oxfordshire 006D	E01028791	4	0	1	2	0	0	49%	51%
West Oxfordshire 007A	E01028784	5	0	2	2	1	0	51%	49%
West Oxfordshire 007B	E01028792	3	0	1	1	0	0	48%	52%
West Oxfordshire 007C	E01028793	4	0	1	2	0	0	49%	51%
West Oxfordshire 007D	E01028794	4	0	1	1	1	0	49%	51%
West Oxfordshire 008A	E01028810	4	0	2	1	0	0	50%	50%
West Oxfordshire 008B	E01028811	4	1	2	1	0	0	48%	52%
West Oxfordshire 008D	E01028813	3	1	1	1	0	0	49%	51%
West Oxfordshire 008E	E01028814	4	0	2	1	0	0	48%	52%
West Oxfordshire 008F	E01028815	3	0	1	1	0	0	49%	51%
West Oxfordshire 008G	E01032947	4	0	2	2	0	0	49%	51%
West Oxfordshire 008H	E01032948	4	0	1	2	0	0	48%	52%
West Oxfordshire 008I	E01032952	4	1	2	1	0	0	46%	54%
West Oxfordshire 009A	E01028809	3	1	2	1	0	0	48%	52%
West Oxfordshire 009B	E01028820	3	0	1	1	0	0	50%	50%
West Oxfordshire 009C	E01028821	4	0	2	1	0	0	50%	50%
West Oxfordshire 009D	E01028822	4	0	2	1	0	0	48%	52%
West Oxfordshire 010A	E01028807	6	1	3	2	0	0	47%	53%
West Oxfordshire 010B	E01028808	4	1	2	1	0	0	49%	51%
West Oxfordshire 010C	E01028816	3	0	1	1	0	0	50%	50%

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West Oxfordshire 010D	E01028817	4	0	2	1	0	0	50%	50%
West Oxfordshire 010E	E01028818	5	1	3	1	0	0	46%	54%
West Oxfordshire 010F	E01028819	5	1	2	1	0	0	48%	52%
West Oxfordshire 011A	E01028785	4	1	2	1	0	0	48%	52%
West Oxfordshire 011B	E01028786	3	0	1	1	0	0	49%	51%
West Oxfordshire 011C	E01028787	3	1	1	1	0	0	49%	51%
West Oxfordshire 011D	E01028800	3	0	1	1	0	0	50%	50%
West Oxfordshire 012A	E01028762	5	0	2	2	1	0	50%	50%
West Oxfordshire 012B	E01028766	5	0	2	2	1	0	48%	52%
West Oxfordshire 012C	E01028767	5	1	2	2	0	0	49%	51%
West Oxfordshire 013D	E01028772	5	0	2	2	0	0	50%	50%
West Oxfordshire 013E	E01032949	4	0	1	1	0	0	50%	50%
West Oxfordshire 013F	E01032950	4	0	1	2	0	0	48%	53%
West Oxfordshire 013G	E01032951	4	0	2	1	0	0	50%	50%
West Oxfordshire 013H	E01032953	5	0	3	2	0	0	49%	51%
West Oxfordshire 014A	E01028771	4	1	2	1	0	0	49%	51%
West Oxfordshire 014B	E01028773	4	0	2	1	0	0	51%	49%
West Oxfordshire 014C	E01028774	3	1	1	1	0	0	64%	36%
West Oxfordshire 014D	E01028775	3	0	1	1	0	0	52%	48%
West Oxfordshire 015A	E01028764	5	0	2	2	0	0	48%	52%
West Oxfordshire 015B	E01028765	5	1	2	2	1	0	50%	50%
West Oxfordshire 015C	E01028801	3	0	1	2	0	0	50%	50%
West Oxfordshire 015D	E01028802	4	0	1	2	1	0	49%	51%
Total		1606	281	666	493	119	47		

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10.5. Oxfordshire's Sample size with confidence level 94%

Appendix 5: Oxfordshire's Sample size with confidence level 94%.

Confidence level 94%									
2011 super output area - lower layer		Sample size	Sample for No cars or vans in household	Sample for 1 car or van in household	Sample for 2 cars or vans in household	Sample for 3 cars or vans in household	Sample for 4 or more cars or vans in household	Males	Females
Cherwell 001A	E01028479	4	0	1	2	1	0	50%	50%
Cherwell 001B	E01028480	5	0	2	2	1	0	49%	51%
Cherwell 001C	E01028508	3	0	1	2	0	0	48%	52%
Cherwell 001D	E01028509	5	0	2	2	1	0	50%	50%
Cherwell 002A	E01028441	8	2	3	2	0	0	49%	51%
Cherwell 002C	E01028443	5	1	2	2	0	0	49%	51%
Cherwell 002D	E01028444	5	0	2	1	0	0	50%	50%
Cherwell 002E	E01032943	5	0	2	2	0	0	49%	51%
Cherwell 002F	E01032944	5	1	2	1	0	0	51%	49%
Cherwell 003A	E01028445	4	1	2	1	0	0	47%	53%
Cherwell 003B	E01028446	5	1	2	1	0	0	49%	51%
Cherwell 003C	E01028447	4	1	2	1	0	0	52%	48%
Cherwell 003D	E01028448	5	2	2	1	0	0	48%	52%
Cherwell 004A	E01028435	7	4	3	0	0	0	48%	52%
Cherwell 004C	E01028437	4	1	2	1	0	0	49%	51%
Cherwell 004D	E01028438	6	2	3	1	0	0	50%	50%
Cherwell 004E	E01028439	4	1	2	1	0	0	50%	50%
Cherwell 004F	E01028440	6	2	3	1	0	0	51%	49%
Cherwell 004G	E01032941	5	2	2	1	0	0	47%	53%

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Cherwell 004H	E01032942	5	2	3	1	0	0	50%	50%
Cherwell 005A	E01028449	4	1	2	1	0	0	50%	50%
Cherwell 005B	E01028450	4	2	2	1	0	0	46%	54%
Cherwell 005C	E01028451	4	1	2	1	0	0	52%	48%
Cherwell 005D	E01028452	4	1	2	1	0	0	49%	51%
Cherwell 005E	E01028453	4	1	2	1	0	0	48%	52%
Cherwell 005F	E01028454	5	2	2	1	0	0	48%	52%
Cherwell 006A	E01028430	5	1	3	1	0	0	50%	50%
Cherwell 006B	E01028431	5	1	2	1	0	0	48%	52%
Cherwell 006C	E01028432	5	1	2	1	0	0	47%	53%
Cherwell 006D	E01028433	6	1	3	2	0	0	47%	53%
Cherwell 006E	E01028434	4	0	2	1	0	0	43%	57%
Cherwell 007A	E01028426	4	1	2	1	0	0	49%	51%
Cherwell 007B	E01028427	5	1	3	1	0	0	51%	49%
Cherwell 007C	E01028428	4	0	2	1	0	0	49%	51%
Cherwell 007D	E01028429	4	1	2	1	0	0	46%	54%
Cherwell 008A	E01028422	5	0	2	2	0	0	49%	51%
Cherwell 008B	E01028423	5	0	2	2	0	0	46%	54%
Cherwell 008C	E01028475	7	1	3	3	1	0	49%	51%
Cherwell 008D	E01028476	7	0	2	3	1	0	50%	50%
Cherwell 009A	E01028474	5	1	2	2	1	0	50%	50%
Cherwell 009B	E01028485	4	0	1	2	0	0	47%	53%
Cherwell 009C	E01028486	4	0	1	2	1	0	49%	51%
Cherwell 009D	E01028503	4	0	1	2	0	0	48%	52%
Cherwell 009E	E01028504	5	0	1	2	1	0	51%	49%
Cherwell 010A	E01028481	5	1	2	2	0	0	48%	52%
Cherwell 010B	E01028482	4	0	1	2	1	0	48%	52%
Cherwell 010C	E01028505	6	0	3	2	0	0	49%	51%

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Cherwell 010D	E01028506	6	0	2	2	1	0	48%	52%
Cherwell 010E	E01028507	5	0	1	2	1	0	50%	50%
Cherwell 011A	E01028425	5	0	3	2	0	0	56%	44%
Cherwell 011B	E01028477	5	0	1	2	1	0	48%	52%
Cherwell 011C	E01028478	4	0	1	2	0	0	49%	51%
Cherwell 011D	E01028483	4	0	1	2	1	0	50%	50%
Cherwell 011E	E01028484	4	0	1	1	1	0	49%	51%
Cherwell 011F	E01028499	5	0	2	2	1	0	49%	51%
Cherwell 012A	E01028459	5	1	2	2	0	0	50%	50%
Cherwell 012B	E01028460	6	0	2	3	0	0	50%	50%
Cherwell 012C	E01028461	5	0	2	2	0	0	47%	53%
Cherwell 012D	E01028462	5	1	2	2	0	0	50%	50%
Cherwell 013A	E01028455	4	0	2	2	0	0	50%	50%
Cherwell 013B	E01028456	5	1	2	1	0	0	50%	50%
Cherwell 013C	E01028457	4	0	2	1	0	0	51%	49%
Cherwell 013D	E01028458	5	1	2	1	0	0	50%	50%
Cherwell 013E	E01028467	6	1	3	1	0	0	47%	53%
Cherwell 014A	E01028466	5	2	2	1	0	0	49%	51%
Cherwell 014B	E01028469	5	1	2	2	0	0	48%	52%
Cherwell 014C	E01028470	5	1	2	2	0	0	50%	50%
Cherwell 014D	E01028471	4	1	2	1	0	0	48%	52%
Cherwell 014E	E01028472	4	0	2	1	0	0	51%	49%
Cherwell 014F	E01028473	5	0	2	2	0	0	48%	52%
Cherwell 015A	E01028463	8	1	4	3	0	0	50%	50%
Cherwell 015B	E01028464	5	0	2	2	0	0	50%	50%
Cherwell 015C	E01028465	4	0	2	2	0	0	49%	51%
Cherwell 015D	E01028468	8	3	3	1	0	0	49%	51%
Cherwell 016A	E01028424	5	0	2	2	1	0	52%	48%

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Cherwell 016B	E01028497	5	0	2	2	0	0	49%	51%
Cherwell 016C	E01028498	5	0	2	2	1	0	50%	50%
Cherwell 016D	E01028500	4	0	1	1	0	0	70%	30%
Cherwell 016E	E01028501	4	0	1	2	1	0	49%	51%
Cherwell 016F	E01028502	4	0	1	2	0	0	49%	51%
Cherwell 017A	E01028487	4	1	2	1	0	0	48%	52%
Cherwell 017B	E01028489	5	1	2	2	0	0	49%	51%
Cherwell 017C	E01028490	4	1	2	1	0	0	49%	51%
Cherwell 017D	E01028491	5	1	2	1	0	0	49%	51%
Cherwell 017E	E01028494	4	1	2	1	0	0	49%	51%
Cherwell 018A	E01028492	5	1	2	2	0	0	50%	50%
Cherwell 018B	E01028493	4	1	2	1	0	0	48%	52%
Cherwell 018C	E01028495	4	1	2	1	0	0	49%	51%
Cherwell 018D	E01028496	4	1	2	1	0	0	47%	53%
Cherwell 019A	E01028488	5	1	2	1	0	0	57%	43%
Cherwell 019B	E01028510	5	0	2	2	1	0	50%	50%
Cherwell 019C	E01028511	6	1	3	2	0	0	49%	51%
Cherwell 019D	E01028512	5	0	2	2	0	0	46%	54%
Oxford 001A	E01028594	5	1	2	2	0	0	47%	53%
Oxford 001B	E01028595	5	1	3	1	0	0	47%	53%
Oxford 001C	E01028596	5	1	3	1	0	0	47%	53%
Oxford 001D	E01028597	5	1	3	1	0	0	49%	51%
Oxford 002C	E01028591	4	1	2	1	0	0	54%	46%
Oxford 002D	E01028592	4	1	2	1	0	0	53%	47%
Oxford 002F	E01032554	8	2	4	2	0	0	46%	54%
Oxford 002G	E01032555	6	2	3	1	0	0	48%	52%
Oxford 003A	E01028565	4	1	2	1	0	0	49%	51%
Oxford 003B	E01028583	3	1	2	0	0	0	46%	54%

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Oxford 003C	E01028584	9	2	5	2	0	0	49%	51%
Oxford 003D	E01028585	3	1	2	1	0	0	51%	49%
Oxford 004A	E01028560	5	1	3	1	0	0	48%	52%
Oxford 004B	E01028561	5	1	3	1	0	0	47%	53%
Oxford 004C	E01028562	5	1	2	1	0	0	47%	53%
Oxford 004D	E01028563	5	1	2	1	0	0	49%	51%
Oxford 005A	E01028513	7	3	3	1	0	0	47%	53%
Oxford 005B	E01028514	4	2	2	1	0	0	48%	52%
Oxford 005C	E01028516	6	2	3	1	0	0	48%	52%
Oxford 005D	E01028538	5	2	2	1	0	0	48%	52%
Oxford 006A	E01028534	4	1	2	1	0	0	47%	53%
Oxford 006B	E01028535	5	1	3	1	0	0	47%	53%
Oxford 006C	E01028536	5	2	2	1	0	0	44%	56%
Oxford 006D	E01028537	6	3	2	1	0	0	45%	55%
Oxford 006E	E01028539	5	1	3	1	0	0	52%	48%
Oxford 006F	E01028540	4	1	2	1	0	0	45%	55%
Oxford 007A	E01028515	5	1	2	1	0	0	48%	52%
Oxford 007B	E01028571	5	1	3	1	0	0	48%	52%
Oxford 007C	E01028572	5	1	2	1	0	0	49%	51%
Oxford 007D	E01028573	5	1	3	1	0	0	48%	52%
Oxford 007E	E01028574	5	2	2	1	0	0	48%	52%
Oxford 008A	E01028521	5	3	2	0	0	0	57%	43%
Oxford 008B	E01028522	6	4	2	0	0	0	58%	42%
Oxford 008E	E01033282	10	4	5	1	0	0	51%	49%
Oxford 009A	E01028548	6	2	3	1	0	0	51%	49%
Oxford 009B	E01028549	6	3	3	1	0	0	53%	47%
Oxford 009C	E01028550	5	3	2	0	0	0	50%	50%
Oxford 009D	E01028551	5	2	2	0	0	0	53%	47%

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Oxford 010A	E01028523	5	2	2	1	0	0	47%	53%
Oxford 010B	E01028524	5	2	2	1	0	0	49%	51%
Oxford 010C	E01028525	6	2	2	1	0	0	47%	53%
Oxford 010D	E01028526	4	2	2	1	0	0	48%	52%
Oxford 011A	E01028579	4	1	2	1	0	0	46%	54%
Oxford 011B	E01028580	4	2	2	1	0	0	52%	48%
Oxford 011C	E01028581	4	1	2	1	0	0	49%	51%
Oxford 011D	E01028582	5	3	1	0	0	0	49%	51%
Oxford 011E	E01028586	5	2	2	1	0	0	50%	50%
Oxford 011F	E01028587	6	3	2	1	0	0	50%	50%
Oxford 011G	E01028588	4	2	1	0	0	0	52%	48%
Oxford 012A	E01028541	5	2	2	1	0	0	47%	53%
Oxford 012B	E01028542	6	2	3	1	0	0	52%	48%
Oxford 012C	E01028543	5	2	2	0	0	0	53%	47%
Oxford 012D	E01028544	5	2	2	1	0	0	50%	50%
Oxford 013A	E01028531	7	2	3	1	0	0	50%	50%
Oxford 013B	E01028532	8	3	3	1	0	0	51%	49%
Oxford 013C	E01028533	6	2	3	1	0	0	50%	50%
Oxford 013D	E01028556	5	1	3	1	0	0	49%	51%
Oxford 013E	E01028557	5	2	2	1	0	0	47%	53%
Oxford 013F	E01028558	5	1	2	1	0	0	52%	48%
Oxford 013G	E01028559	5	1	2	1	0	0	52%	48%
Oxford 014A	E01028545	5	1	2	1	0	0	48%	52%
Oxford 014B	E01028546	6	2	2	1	0	0	50%	50%
Oxford 014C	E01028547	6	2	3	1	0	0	51%	49%
Oxford 015A	E01028527	5	1	3	1	0	0	49%	51%
Oxford 015B	E01028528	4	1	2	1	0	0	52%	48%
Oxford 015C	E01028529	5	2	2	1	0	0	49%	51%

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Oxford 015D	E01028530	5	2	2	1	0	0	50%	50%
Oxford 015E	E01028575	5	1	3	1	0	0	49%	51%
Oxford 015F	E01028578	5	1	2	1	0	0	50%	50%
Oxford 016A	E01028552	6	2	2	1	0	0	48%	52%
Oxford 016B	E01028553	6	1	3	1	0	0	51%	49%
Oxford 016C	E01028554	4	1	2	1	0	0	49%	51%
Oxford 016D	E01028555	5	1	3	1	0	0	50%	50%
Oxford 016E	E01028576	4	2	1	1	0	0	49%	51%
Oxford 016F	E01028577	6	2	3	1	0	0	49%	51%
Oxford 017A	E01028517	4	1	2	1	0	0	48%	52%
Oxford 017B	E01028518	5	2	2	1	0	0	48%	52%
Oxford 017C	E01028519	4	2	2	1	0	0	49%	51%
Oxford 017D	E01028567	5	2	2	1	0	0	48%	52%
Oxford 018A	E01028520	5	2	2	1	0	0	50%	50%
Oxford 018B	E01028568	5	2	2	1	0	0	45%	55%
Oxford 018C	E01028569	5	2	2	1	0	0	44%	56%
Oxford 018D	E01028570	6	1	3	1	0	0	48%	52%
South Oxfordshire 001A	E01028666	5	1	2	2	0	0	48%	52%
South Oxfordshire 001B	E01028667	4	0	2	2	0	0	49%	51%
South Oxfordshire 001C	E01028668	4	0	2	2	0	0	49%	51%
South Oxfordshire 001D	E01028669	4	0	2	2	0	0	48%	52%
South Oxfordshire 002A	E01028638	4	0	2	2	1	0	50%	50%
South Oxfordshire 002B	E01028639	4	0	1	1	0	0	49%	51%
South Oxfordshire 002C	E01028640	5	0	2	2	0	0	50%	50%
South Oxfordshire 002D	E01028683	4	0	2	2	0	0	50%	50%
South Oxfordshire 003A	E01028670	4	0	1	2	1	0	48%	52%
South Oxfordshire 003B	E01028671	5	1	2	1	0	0	49%	51%
South Oxfordshire 003C	E01028672	5	1	2	2	0	0	49%	51%

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South Oxfordshire 003D	E01028673	4	0	2	1	0	0	46%	54%
South Oxfordshire 004A	E01028646	4	0	1	1	0	0	49%	51%
South Oxfordshire 004B	E01028647	5	0	2	2	1	0	48%	52%
South Oxfordshire 004C	E01028681	4	0	2	2	0	0	50%	50%
South Oxfordshire 004D	E01028682	4	0	2	1	0	0	48%	52%
South Oxfordshire 004E	E01028684	5	1	2	2	0	0	48%	52%
South Oxfordshire 005A	E01028598	7	0	2	3	1	1	50%	50%
South Oxfordshire 005B	E01028613	4	0	1	2	1	0	49%	51%
South Oxfordshire 005C	E01028614	5	0	1	2	0	0	49%	51%
South Oxfordshire 005D	E01028615	5	0	2	2	1	0	48%	52%
South Oxfordshire 005E	E01028616	4	0	1	2	1	0	48%	52%
South Oxfordshire 006A	E01028604	4	1	2	1	0	0	50%	50%
South Oxfordshire 006B	E01028605	5	1	2	1	0	0	49%	51%
South Oxfordshire 006C	E01028607	4	0	1	2	0	0	48%	52%
South Oxfordshire 006D	E01028641	4	0	2	1	0	0	48%	52%
South Oxfordshire 006E	E01028657	4	1	2	1	0	0	50%	50%
South Oxfordshire 006F	E01028658	4	0	1	2	0	0	49%	51%
South Oxfordshire 007A	E01028600	5	0	2	2	1	0	50%	50%
South Oxfordshire 007B	E01028603	4	0	1	2	1	0	50%	50%
South Oxfordshire 007C	E01028606	6	1	2	2	1	0	49%	51%
South Oxfordshire 007D	E01028609	4	0	1	2	0	0	50%	50%
South Oxfordshire 007E	E01028610	5	0	2	2	1	0	50%	50%
South Oxfordshire 008A	E01028678	5	0	1	2	1	0	49%	51%
South Oxfordshire 008B	E01028679	7	1	2	3	1	0	48%	52%
South Oxfordshire 008C	E01028680	6	1	3	2	0	0	46%	54%
South Oxfordshire 009A	E01028625	6	0	3	2	0	0	50%	50%
South Oxfordshire 009B	E01028626	5	0	2	2	0	0	51%	49%
South Oxfordshire 009C	E01028627	5	0	2	2	0	0	48%	52%

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South Oxfordshire 009D	E01028628	4	0	2	2	0	0	51%	49%
South Oxfordshire 009E	E01028629	5	1	3	2	0	0	49%	51%
South Oxfordshire 010A	E01028621	4	1	2	1	0	0	51%	49%
South Oxfordshire 010B	E01028622	4	1	2	1	0	0	48%	52%
South Oxfordshire 010C	E01028623	5	1	2	1	0	0	49%	51%
South Oxfordshire 010D	E01028624	4	1	2	1	0	0	48%	52%
South Oxfordshire 011A	E01028599	5	0	2	2	0	0	47%	53%
South Oxfordshire 011B	E01028601	4	0	1	1	0	0	62%	38%
South Oxfordshire 011C	E01028602	4	0	2	2	0	0	50%	50%
South Oxfordshire 011D	E01028620	8	0	3	3	1	0	55%	45%
South Oxfordshire 012A	E01028608	4	0	1	2	0	0	49%	51%
South Oxfordshire 012B	E01028617	6	1	3	2	0	0	46%	54%
South Oxfordshire 012C	E01028674	4	0	2	2	0	0	49%	51%
South Oxfordshire 012D	E01028675	4	1	2	1	0	0	49%	51%
South Oxfordshire 012E	E01028676	6	1	3	2	0	0	48%	52%
South Oxfordshire 012F	E01028677	6	2	3	1	0	0	48%	52%
South Oxfordshire 013A	E01028630	6	1	3	2	0	0	54%	46%
South Oxfordshire 013B	E01028631	4	1	2	1	0	0	50%	50%
South Oxfordshire 013C	E01028632	4	1	2	1	0	0	49%	51%
South Oxfordshire 013D	E01028633	5	1	3	1	0	0	51%	49%
South Oxfordshire 014A	E01028634	4	0	2	2	0	0	49%	51%
South Oxfordshire 014B	E01028635	5	1	2	1	0	0	50%	50%
South Oxfordshire 014C	E01028636	4	1	2	1	0	0	45%	55%
South Oxfordshire 014D	E01028637	5	1	2	2	0	0	50%	50%
South Oxfordshire 015A	E01028618	5	0	2	2	1	0	51%	49%
South Oxfordshire 015B	E01028619	6	1	2	2	0	0	49%	51%
South Oxfordshire 015C	E01028644	5	1	2	2	0	0	49%	51%
South Oxfordshire 015D	E01028648	4	0	1	2	0	0	50%	50%

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South Oxfordshire 015E	E01028649	5	0	1	2	1	0	49%	51%
South Oxfordshire 016A	E01028650	6	1	3	2	0	0	46%	54%
South Oxfordshire 016B	E01028651	6	2	3	1	0	0	47%	53%
South Oxfordshire 016C	E01028652	8	1	4	2	0	0	44%	56%
South Oxfordshire 017A	E01028653	5	1	2	2	0	0	48%	52%
South Oxfordshire 017B	E01028654	5	1	2	2	0	0	49%	51%
South Oxfordshire 017C	E01028655	7	1	4	2	0	0	45%	55%
South Oxfordshire 017D	E01028656	4	0	1	2	0	0	48%	52%
South Oxfordshire 018A	E01028611	3	0	1	1	1	0	49%	51%
South Oxfordshire 018B	E01028642	4	0	1	2	1	0	48%	52%
South Oxfordshire 018C	E01028643	4	0	1	2	1	0	48%	52%
South Oxfordshire 018D	E01028645	5	0	2	2	0	0	47%	53%
South Oxfordshire 018E	E01028685	4	0	1	2	0	0	48%	52%
South Oxfordshire 018F	E01028686	4	0	1	1	0	0	57%	43%
South Oxfordshire 019A	E01028612	4	0	1	2	1	0	47%	53%
South Oxfordshire 019B	E01028660	5	0	2	2	1	0	50%	50%
South Oxfordshire 019C	E01028661	5	0	1	2	1	0	54%	46%
South Oxfordshire 019D	E01028662	4	0	1	2	1	0	47%	53%
South Oxfordshire 020A	E01028659	5	0	1	2	1	0	52%	48%
South Oxfordshire 020B	E01028663	5	1	2	2	1	0	47%	53%
South Oxfordshire 020C	E01028664	4	0	2	1	1	0	47%	53%
South Oxfordshire 020D	E01028665	4	0	2	2	0	0	47%	53%
Vale of White Horse 001A	E01028708	6	1	2	2	0	0	47%	53%
Vale of White Horse 001B	E01028709	5	1	2	2	0	0	49%	51%
Vale of White Horse 001C	E01028710	5	0	2	2	0	0	50%	50%
Vale of White Horse 001D	E01028711	5	1	2	2	1	0	49%	51%
Vale of White Horse 002A	E01028733	4	1	2	1	0	0	49%	51%
Vale of White Horse 002B	E01028734	5	1	2	2	0	0	49%	51%

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Vale of White Horse 002C	E01028735	5	1	2	1	0	0	51%	49%
Vale of White Horse 002D	E01028740	5	1	3	1	0	0	51%	49%
Vale of White Horse 002E	E01028741	4	1	1	1	0	0	48%	52%
Vale of White Horse 002F	E01028742	6	2	2	1	0	0	49%	51%
Vale of White Horse 003A	E01028738	4	0	2	1	0	0	62%	38%
Vale of White Horse 003B	E01028739	5	1	2	2	1	0	54%	46%
Vale of White Horse 003C	E01028743	4	1	2	1	0	0	70%	30%
Vale of White Horse 003D	E01028744	4	1	2	1	0	0	49%	51%
Vale of White Horse 003E	E01028750	5	1	2	1	0	0	49%	51%
Vale of White Horse 003F	E01028751	5	0	1	2	1	0	48%	52%
Vale of White Horse 003G	E01028752	5	0	2	2	1	0	49%	51%
Vale of White Horse 004A	E01028693	5	0	2	2	0	0	50%	50%
Vale of White Horse 004B	E01028694	5	0	2	2	1	0	51%	49%
Vale of White Horse 004C	E01028701	5	1	2	2	0	0	49%	51%
Vale of White Horse 004D	E01028705	4	0	1	2	0	0	49%	51%
Vale of White Horse 004E	E01028706	5	0	2	2	0	0	51%	49%
Vale of White Horse 004F	E01028707	5	0	2	2	0	0	49%	51%
Vale of White Horse 005A	E01028688	4	1	2	1	0	0	50%	50%
Vale of White Horse 005B	E01028689	5	1	3	1	0	0	50%	50%
Vale of White Horse 005C	E01028695	5	1	2	2	0	0	50%	50%
Vale of White Horse 005D	E01028699	5	1	2	2	0	0	51%	49%
Vale of White Horse 006B	E01028696	4	0	2	2	0	0	52%	48%
Vale of White Horse 006C	E01028697	5	1	3	1	0	0	47%	53%
Vale of White Horse 006D	E01028698	5	1	3	2	0	0	48%	52%
Vale of White Horse 006E	E01028700	5	2	2	1	0	0	48%	52%
Vale of White Horse 006F	E01028703	6	2	3	1	0	0	46%	54%
Vale of White Horse 006G	E01033305	5	1	3	1	0	0	48%	52%
Vale of White Horse 006H	E01033306	6	2	3	1	0	0	48%	52%

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Vale of White Horse 007A	E01028726	7	1	2	3	1	0	50%	50%
Vale of White Horse 007B	E01028736	7	0	2	3	1	0	49%	51%
Vale of White Horse 007C	E01028737	7	0	2	3	1	1	49%	51%
Vale of White Horse 008A	E01028690	6	1	3	2	0	0	51%	49%
Vale of White Horse 008B	E01028691	5	1	2	1	0	0	48%	52%
Vale of White Horse 008C	E01028692	4	1	2	1	0	0	48%	52%
Vale of White Horse 008D	E01028702	4	0	2	2	0	0	48%	52%
Vale of White Horse 008E	E01028704	7	2	3	2	0	0	47%	53%
Vale of White Horse 009A	E01028716	6	1	2	2	0	0	50%	50%
Vale of White Horse 009B	E01028717	6	2	3	2	0	0	47%	53%
Vale of White Horse 009C	E01028718	5	1	2	1	0	0	48%	52%
Vale of White Horse 009D	E01028719	5	0	2	2	1	0	49%	51%
Vale of White Horse 009E	E01028749	8	1	3	3	1	0	50%	50%
Vale of White Horse 010A	E01028714	8	1	3	3	1	0	49%	51%
Vale of White Horse 010B	E01028731	4	1	2	1	0	0	49%	51%
Vale of White Horse 010C	E01028732	4	0	2	2	0	0	50%	50%
Vale of White Horse 010D	E01028753	5	1	2	1	0	0	48%	52%
Vale of White Horse 010E	E01028754	4	0	2	2	1	0	48%	52%
Vale of White Horse 011A	E01028721	4	0	1	2	0	0	51%	49%
Vale of White Horse 011B	E01028722	5	1	3	2	0	0	50%	50%
Vale of White Horse 011C	E01028723	5	1	2	2	0	0	51%	49%
Vale of White Horse 011D	E01028724	4	0	2	2	0	0	51%	49%
Vale of White Horse 011E	E01028725	5	1	2	2	0	0	51%	49%
Vale of White Horse 014A	E01028755	5	1	2	2	0	0	49%	51%
Vale of White Horse 014B	E01028756	9	2	4	2	0	0	47%	53%
Vale of White Horse 014C	E01028758	5	1	2	2	0	0	49%	51%
Vale of White Horse 014D	E01028759	5	1	2	2	0	0	51%	49%
Vale of White Horse 014E	E01028760	4	0	1	1	0	0	48%	52%

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Vale of White Horse 014F	E01028761	4	0	2	2	0	0	49%	51%
Vale of White Horse 015A	E01028712	7	1	3	3	1	0	48%	52%
Vale of White Horse 015B	E01028727	5	0	2	2	1	0	48%	52%
Vale of White Horse 015C	E01028728	4	1	1	1	0	0	46%	54%
Vale of White Horse 015D	E01028729	3	0	1	2	0	0	50%	50%
Vale of White Horse 015E	E01028730	5	0	1	2	1	0	50%	50%
Vale of White Horse 015F	E01028757	5	1	2	1	0	0	46%	54%
Vale of White Horse 016E	E01028713	8	1	2	3	1	1	50%	50%
Vale of White Horse 016F	E01028715	4	0	1	2	1	0	49%	51%
Vale of White Horse 016G	E01028720	7	1	2	3	1	0	49%	51%
Vale of White Horse 016A	E01028745	4	0	2	2	0	0	51%	49%
Vale of White Horse 016B	E01028746	4	0	1	2	0	0	50%	50%
Vale of White Horse 016C	E01028747	4	0	1	1	0	0	52%	48%
Vale of White Horse 016D	E01028748	3	0	1	1	0	0	50%	50%
West Oxfordshire 001A	E01028780	7	1	3	2	0	0	50%	50%
West Oxfordshire 001B	E01028781	4	1	2	1	0	0	47%	53%
West Oxfordshire 001C	E01028782	5	1	2	2	0	0	48%	52%
West Oxfordshire 001D	E01028783	6	1	3	1	0	0	47%	53%
West Oxfordshire 002A	E01028795	5	0	2	2	1	0	48%	52%
West Oxfordshire 002B	E01028796	4	0	2	1	0	0	51%	49%
West Oxfordshire 002C	E01028797	4	0	1	2	0	0	49%	51%
West Oxfordshire 002D	E01028806	6	0	2	3	1	0	47%	53%
West Oxfordshire 003A	E01028763	7	0	2	3	1	0	47%	53%
West Oxfordshire 003B	E01028776	6	0	2	2	1	0	49%	51%
West Oxfordshire 003C	E01028798	7	1	3	3	1	0	49%	51%
West Oxfordshire 004B	E01028804	4	0	2	2	0	0	50%	50%
West Oxfordshire 004D	E01028823	5	1	3	1	0	0	45%	55%
West Oxfordshire 004E	E01028824	5	1	2	2	0	0	47%	53%

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West Oxfordshire 004F	E01028825	4	0	2	2	0	0	48%	52%
West Oxfordshire 004G	E01032954	9	1	3	4	1	0	48%	52%
West Oxfordshire 005A	E01028777	4	1	2	1	0	0	47%	53%
West Oxfordshire 005B	E01028778	5	1	2	1	0	0	49%	51%
West Oxfordshire 005C	E01028779	4	0	1	1	0	0	52%	48%
West Oxfordshire 005D	E01028799	6	1	2	2	1	0	49%	51%
West Oxfordshire 006A	E01028788	5	1	3	2	0	0	48%	52%
West Oxfordshire 006B	E01028789	5	0	2	2	1	0	47%	53%
West Oxfordshire 006C	E01028790	4	0	1	1	0	0	51%	49%
West Oxfordshire 006D	E01028791	5	0	2	2	1	0	49%	51%
West Oxfordshire 007A	E01028784	7	1	2	2	1	0	51%	49%
West Oxfordshire 007B	E01028792	4	0	1	1	0	0	48%	52%
West Oxfordshire 007C	E01028793	5	0	2	2	1	0	49%	51%
West Oxfordshire 007D	E01028794	5	0	2	2	1	0	49%	51%
West Oxfordshire 008A	E01028810	5	1	2	1	0	0	50%	50%
West Oxfordshire 008B	E01028811	5	1	2	1	0	0	48%	52%
West Oxfordshire 008D	E01028813	4	1	1	1	0	0	49%	51%
West Oxfordshire 008E	E01028814	5	1	2	2	0	0	48%	52%
West Oxfordshire 008F	E01028815	4	0	1	2	0	0	49%	51%
West Oxfordshire 008G	E01032947	5	1	2	2	0	0	49%	51%
West Oxfordshire 008H	E01032948	6	1	2	3	1	0	48%	52%
West Oxfordshire 008I	E01032952	5	1	2	2	0	0	46%	54%
West Oxfordshire 009A	E01028809	4	1	2	1	0	0	48%	52%
West Oxfordshire 009B	E01028820	4	0	2	2	0	0	50%	50%
West Oxfordshire 009C	E01028821	5	1	2	2	0	0	50%	50%
West Oxfordshire 009D	E01028822	5	0	2	2	1	0	48%	52%
West Oxfordshire 010A	E01028807	8	1	4	2	0	0	47%	53%
West Oxfordshire 010B	E01028808	6	1	3	2	0	0	49%	51%

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West Oxfordshire 010C	E01028816	4	0	2	1	0	0	50%	50%
West Oxfordshire 010D	E01028817	5	1	2	2	0	0	50%	50%
West Oxfordshire 010E	E01028818	7	2	3	1	0	0	46%	54%
West Oxfordshire 010F	E01028819	6	2	2	1	0	0	48%	52%
West Oxfordshire 011A	E01028785	5	1	2	1	0	0	48%	52%
West Oxfordshire 011B	E01028786	4	0	2	1	0	0	49%	51%
West Oxfordshire 011C	E01028787	4	1	2	1	0	0	49%	51%
West Oxfordshire 011D	E01028800	4	0	1	2	1	0	50%	50%
West Oxfordshire 012A	E01028762	6	0	2	2	1	0	50%	50%
West Oxfordshire 012B	E01028766	7	0	2	3	1	0	48%	52%
West Oxfordshire 012C	E01028767	7	1	3	2	0	0	49%	51%
West Oxfordshire 013D	E01028772	6	0	2	2	0	0	50%	50%
West Oxfordshire 013E	E01032949	5	0	2	2	0	0	50%	50%
West Oxfordshire 013F	E01032950	5	0	2	3	0	0	48%	53%
West Oxfordshire 013G	E01032951	6	0	3	2	0	0	50%	50%
West Oxfordshire 013H	E01032953	7	1	3	2	0	0	49%	51%
West Oxfordshire 014A	E01028771	5	1	2	1	0	0	49%	51%
West Oxfordshire 014B	E01028773	5	1	2	1	0	0	51%	49%
West Oxfordshire 014C	E01028774	4	1	2	1	0	0	64%	36%
West Oxfordshire 014D	E01028775	4	0	2	2	0	0	52%	48%
West Oxfordshire 015A	E01028764	6	0	2	2	1	0	48%	52%
West Oxfordshire 015B	E01028765	6	1	2	2	1	0	50%	50%
West Oxfordshire 015C	E01028801	4	0	1	2	1	0	50%	50%
West Oxfordshire 015D	E01028802	5	0	1	2	1	0	49%	51%
Total		2,027	355	840	623	150	59		

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10.6. Trikala - Pharmacists pre-demonstration questionnaire

Appendix 6: Trikala - Pharmacists pre-demonstration questionnaire.

Pharmacists pre-demonstration questionnaire

Questions

A. Details and mode of operation of the pharmacy

1. Where is your pharmacy located?
2. At the moment, what procedure do you follow for ordering the medical products from the pharmaceutical warehouse? (if done electronically then the unmanned aerial flying vehicles (UAVs) company will be able to have direct access to the order and therefore a faster response)
3. How many one-off routes occur weekly for covering your supply needs of pharmaceutical/paramedic products?
4. Currently, how often are pharmaceutical/paramedic shipments made to your pharmacy?
5. How long does it take for an order to reach your pharmacy (from the moment of its submission)?

B. Perceptions and preferences about unmanned aerial flying vehicles (UAVs)

6. Do you know what unmanned aerial flying vehicles (UAVs) are? If so, what is your opinion about them?
7. Would you be interested in transporting pharmaceutical/paramedic materials, from the pharmaceutical warehouse to your pharmacy, using unmanned aerial flying vehicles (UAVs)? If yes, under which conditions?
8. What kind of pharmaceutical/paramedic materials (e.g., medicines, splints, bandages, orthopaedics materials, etc.) would you be interested to transfer using a unmanned aerial flying vehicles (UAVs)?
9. What would be the ideal unmanned aerial flying vehicles (UAVs) capacity (in kg) for your transporting needs?
10. How often do you think you would use an unmanned aerial flying vehicles (UAVs) service to transport pharmaceutical/paramedic products under normal circumstances?
11. How often do you think you would use an unmanned aerial flying vehicles (UAVs) service to transport pharmaceutical/paramedic products under exceptional circumstances such as the COVID-19 outbreak?

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12. Have you used an unmanned aerial flying vehicles (UAVs) so far to receive or deliver pharmaceutical/paramedic products?
    a. If yes, how long did it take for your order to arrive, from the time it was placed until it reached your pharmacy?
13. How long would you be willing to wait to receive your order?
14. Would you be willing to pay for this service?
15. Could you please answer the following questions?

	Unmanned aerial flying vehicles (UAVs)	Autonomous (driverless) delivery robots	Cargo bikes
Delivery time	1. 1.5 hours 2. 3 hours 3. 5 hours 4. same day-delivery 5. next-day delivery 6. more than 2 days		
Shipping price (independent of package price – *to be stressed during the experiment*) (in €)	1. 6 2. 8 3. 12 4. 14 5. 18 6. 22		
Delivery point choice availability	1. Home 2. Public space (such as storage locks) 3. Work		
Tracking app	• No • Regular updates • Precise location		
Delivery time window choice	• Yes • No		

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Payment	1. Card-electronic 2. Through app 3. Cash only		
Weight	• Less than 0.5 kg • 0.5-1 kg • 1-2.5 kg	• Less than 0.5 kg • 0.5-1 kg • 1-2.5 kgs • 2.5-5 kgs	• Less than 0.5 kg • 0.5-1 kg • 1-2.5 kgs • 2.5-5 kgs • 5-10 kgs
Capacity of mode	• 1 package • 2 packages • 3 packages • 4 packages		

16. Would you cover the cost of such a service or charge it to the customer who placed the order?
17. Would you be interested in participating in a pilot trial of delivery or receipt of pharmaceutical/paramedic products in your area?
    a. If yes, what would you expect from this pilot?
    b. If not, what are the reasons that would demotivate you from participating?
18. Do you think that the direct transport of a medical product via unmanned aerial flying vehicles (UAVs) increases the customer's feeling of safety and satisfaction towards the pharmacy?
19. What do you think are the drawbacks of adopting unmanned aerial flying vehicles (UAVs) for the transportation of pharmaceutical/paramedic materials?
20. Please indicate your level of agreement for each one of the following statements, regarding your **concerns** in adopting unmanned aerial flying vehicles (UAVs) for the transport of pharmaceutical/paramedic materials.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I expect that there might be issues in the following ***technical aspects***:					

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Flight range					
Routing and scheduling of unmanned aerial flying vehicles (UAVs)					
Limited battery characteristics of unmanned aerial flying vehicles (UAVs)					
Limited carrying capacity					
Weather					
Inexperienced remote pilots					
I expect that there might be issues in the following ***social aspects***:					
Public perception and acceptance					
Threat to privacy by general public					
Customer perception regarding receiving the items					
Security issues (cyber-attacks, hijacking, terrorism etc.)					
I expect that there might be issues in the following ***legal and managerial aspects***:					
Complicated regulatory framework					
Top management commitment					
Legality issues					
Commercialisation of unmanned aerial flying vehicles (UAVs)					
I expect that there might be issues in the following ***safety aspects***:					
Causing property damage					
Causing fire					
Injuring or killing someone					
Crashing into a manned aircraft					
Crashing into another unmanned aerial flying vehicles (UAVs)					

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21. What are the potential benefits of adopting unmanned aerial flying vehicles (UAVs) for the transportation of pharmaceutical/paramedic materials? (open answer at the beginning and then we ask the questions from the table below).

Please indicate your level of agreement for each one of the following items, regarding your expectations of participating in the pilot survey of using unmanned aerial flying vehicles (UAVs) for the transport of pharmaceutical/paramedic materials.

The application and use of unmanned aerial flying vehicles (UAVs) will lead to:

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Faster deliveries to avoid traffic jams					
Reducing the carbon footprint					
Less fuel requirements					
No parking costs					
Less infrastructure investments					
Decreased operating costs					
Decreased labour costs					
Improved responsiveness and efficiency in the delivery of goods					
Efficient routing of deliveries					
Efficient route adjustments using real time traffic data					
Accurate tracking of the position of unmanned aerial flying vehicles (UAVs)					

Regarding the particular circumstances due to COVID-19.

22. Would you choose to transport pharmaceutical/paramedic using an unmanned aerial flying vehicles (UAVs), to reduce physical contact between warehouse employees and pharmacists?

23. If your area was under lockdown, would you choose to use an unmanned aerial flying vehicles (UAVs) for transferring pharmaceutical/paramedic products?

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24. Would you opt to use an unmanned aerial flying vehicles (UAVs) delivery service in the event of a second wave of COVID-19?

Thank you for your time.

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10.7. Trikala - Pharmacists post-demonstration questionnaire

Appendix 7: Trikala - Pharmacists post-demonstration questionnaire.

Pharmacists post-demonstration questionnaire

Questions

A. Details and mode of operation of the pharmacy

1. Where is your pharmacy located?
2. At the moment, what procedure do you follow for ordering the medical products from the pharmaceutical warehouse? (if done electronically then the unmanned aerial flying vehicles (UAVs) company will be able to have direct access to the order and therefore a faster response)
3. How many one-off routes occur weekly for covering your supply needs of pharmaceutical/paramedic products?
4. In the current situation, how often are pharmaceutical/paramedic shipments made to your pharmacy?
5. How long does it take for an order to reach your pharmacy (from the moment of its submission)?

B. Perceptions and observations about unmanned aerial flying vehicles (UAVs) after their pilot use in your area.

6. Do you know what unmanned aerial flying vehicles (UAVs) are? If so, what is your opinion about them?
7. Would you be interested in continuing to transport pharmaceutical/paramedic materials, from the pharmaceutical warehouse to your pharmacy, using an unmanned aerial flying vehicles (UAVs)? If yes, under which conditions?
8. After your first experience during pilot use, what kind of pharmaceutical materials (e.g., medicines, splints, bandages, orthopaedics materials, etc.) would you be interested to transfer using an unmanned aerial flying vehicles (UAVs)?
9. What would be the ideal unmanned aerial flying vehicles (UAVs) capacity (in kg) for your transporting needs?
10. How often would you use the unmanned aerial flying vehicles (UAVs) service to transport pharmaceutical/paramedic products under normal circumstances?
11. How often would you use the unmanned aerial flying vehicles (UAVs) service for transporting pharmaceutical/paramedic products under exceptional circumstances such as the COVID-19 outbreak?

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12. After the use of the unmanned aerial flying vehicles (UAVs) service, for the receipt/delivery of pharmaceutical/paramedic products:
    a. How long did it take for your order to arrive, from the time it was placed until it reached your pharmacy?
    b. Was there any difficulty with the unmanned aerial flying vehicles (UAVs) range to get to your area?
    c. Has the weather affected the receipt/delivery of pharmaceutical/paramedic products?
    d. In general, what were the technical difficulties you encountered?
13. After the use of the unmanned aerial flying vehicles (UAVs) service, for the receipt/delivery of pharmaceutical/paramedic products:
    a. What difference did you see in shipping costs?
    b. What difference did you see in delivery time?
    c. Was the procedure easier than the procedure you had previously followed?
    d. Generally, what benefits did you find from using this service?
14. Would you be willing to pay for this service?
15. Could you please answer the following questions?

	Unmanned aerial flying vehicles (UAVs)	Autonomous (driverless) delivery robots	Cargo bikes
Delivery time	1. 1.5 hours 2. 3 hours 3. 5 hours 4. same day-delivery 5. next-day delivery 6. more than 2 days		
Shipping price (independent of package price – *to be stressed during the experiment*) (in €)	1. 6 2. 8 3. 12 4. 14 5. 18 6. 22		
Delivery point choice availability	1. Home 2. Public space (such as storage locks)		

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	3. Work		
Tracking app	• No • Regular updates • Precise location		
Delivery time window choice	• Yes • No		
Payment	1. Card-electronic 2. Through app 3. Cash only		
Weight	• Less than 0.5 kg • 0.5-1 kg • 1-2.5 kg	• Less than 0.5 kg • 0.5-1 kg • 1-2.5 kgs • 2.5-5 kgs	• Less than 0.5 kg • 0.5-1 kg • 1-2.5 kgs • 2.5-5 kgs • 5-10 kgs
Capacity of mode	• 1 package • 2 packages • 3 packages • 4 packages		

16. Would you cover the cost of such a service or charge it to the customer who placed the order?
17. Do you think that the direct transport of a medical product via unmanned aerial flying vehicles (UAVs) increases the customer's feeling of safety and satisfaction towards the pharmacy?
18. What do you think are the drawbacks of adopting unmanned aerial flying vehicles (UAVs) for the transportation of pharmaceutical/paramedic materials?
19. Please rate your level of satisfaction with the unmanned aerial flying vehicles (UAVs) demonstration:
    a. Very unsatisfied
    b. Unsatisfied
    c. Neutral

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d. Satisfied
e. Very satisfied

20. Please indicate your level of agreement for each one of the following statements, regarding your **concerns** in adopting unmanned aerial flying vehicles (UAVs) for the transport of pharmaceutical/paramedic materials.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I expect that there might be issues in the following ***technical aspects***:					
Flight range					
Routing and scheduling of unmanned aerial flying vehicles (UAVs)					
Limited battery characteristics of unmanned aerial flying vehicles (UAVs)					
Limited carrying capacity					
Weather					
Inexperienced remote pilots					
I expect that there might be issues in the following ***social aspects***:					
Public perception and acceptance					
Threat to privacy by general public					
Customer perception regarding receiving the items					
Security issues (cyber-attacks, hijacking, terrorism etc.)					
I expect that there might be issues in the following ***legal and managerial aspects***:					
Complicated regulatory framework					
Top management commitment					
Legality issues					

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Commercialisation of unmanned aerial flying vehicles (UAVs)					
*I expect that there might be issues in the following **safety aspects***:					
Causing property damage					
Causing fire					
Injuring or killing someone					
Crashing into a manned aircraft					
Crashing into another unmanned aerial flying vehicles (UAVs)					

21. Following the pilot use of unmanned aerial flying vehicles (UAVs) that took place in your area, what do you think will be the potential benefits of adopting unmanned aerial flying vehicles (UAVs) for the transportation of pharmaceutical/paramedic materials? (free answer at the beginning and then ask the questions from the table below).

Please indicate your level of agreement for each of the following, after your **participation** in the pilot use of an unmanned aerial flying vehicles (UAVs) for the transport of pharmaceutical/paramedic materials.

The application and use of unmanned aerial flying vehicles (UAVs) will lead to:

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Faster deliveries to avoid traffic jams					
Reducing the carbon footprint					
Less fuel requirements					
No parking costs					
Less infrastructure investments					
Decreased operating costs					
Decreased labour costs					
Improved responsiveness and efficiency in the delivery of goods					
Efficient routing of deliveries					

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Efficient route adjustments using real time traffic data					
Accurate tracking of the position of unmanned aerial flying vehicles (UAVs)					

Regarding the particular circumstances due to COVID-19.

22. Would you choose to transport pharmaceutical/paramedic using an unmanned aerial flying vehicles (UAVs), to reduce physical contact between warehouse employees and pharmacists?
23. If your area was under lockdown, would you choose to use an unmanned aerial flying vehicles (UAVs) paramedic for transferring pharmaceutical/paramedic products?
24. Would opt to use an unmanned aerial flying vehicles (UAVs) delivery service in the event of a second wave of COVID-19?

Thank you for your time.

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10.8. Trikala - Residents pre-demonstration questionnaire

Appendix 8: Trikala - Residents pre-demonstration questionnaire.

Residents pre-demonstration questionnaire

QUESTION – RESIDENTS TO BE IMPACTED BY THE PILOT SURVEY

We would like to inform you that a pilot program for within-day transferring pharmaceutical/paramedic materials from Trikala to the pharmacy in your area, is starting.

General Questions

1. In which area is your home located?
2. What is your age?
3. What is your gender?
4. Do you have a driver's license?
5. What is your level of education?
   i. Primary School
   ii. Secondary School
   iii. High School
   iv. Degree in Higher Education
   v. Master's Degree
   vi. Ph.D. or M.D.
   vii. Other
6. What is your household's total annual income? (before tax)
   i. Under 10,000€
   ii. 10.001€ - 25.000€
   iii. 25.001€ - 50.000€
   iv. 50.001€ - 75.000€

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v. 75,000€ and above

7. What is your employment status?
   i. Full-time employee (30+ hours per week)
   ii. Part-time employee (less than 30 hours per week)
   iii. Full-time self-employed (30+ hours per week)
   iv. Part-time self-employed (less than 30 hours per week)
   v. Public Servant
   vi. Student
   vii. Unemployed or looking for a job
   viii. Inability to work due to long-term illness
   ix. Retired
   x. Other
8. What's your marital status?
   i. Single
   ii. Married
   iii. Divorced
   iv. Widower
9. If you are a parent, please specify how many children you have.
10. Does any of the children live with you or less than 10 minutes away from your home?
11. Is there any private vehicle or a bike/scooter available in your household? If yes, how many of each one?
12. Do you have a monthly transport card for public transport?
13. Do you have a mobile phone?
14. Is it a new generation mobile/smartphone?
15. How familiar are you with using apps from your smartphone?
    1. Not at all (I've never downloaded an app to my phone before).
    2. Moderate, I can't install an app, but I can use it.
    3. Enough (at times I've downloaded apps to my mobile and I've used them).

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4. Too much (I frequently use my phone to access apps).

16. Do you have any health problem that limits your ability to move?

If yes, please answer the following questions:

a) Does the health problem you're experiencing prevent you from walking?
   i. It doesn't stop me from walking.
   ii. I'm having trouble walking, but it's not impossible.
   iii. I can't walk around without help.
   iv. I can't walk.

b) Does your health problem prevent you from travelling by bike?
   i. It doesn't stop me from riding my bike.
   ii. I'm having a hard time getting around on my bike, but it's not impossible.
   iii. I can't ride my bike without help.
   iv. I can't ride my bike.

c) Does your health problem prevent you from travelling by car?
   i. It doesn't stop me from driving.
   ii. I'm having a hard time moving around with my car, but it's not impossible.
   iii. I can't drive around without help.
   iv. I can't drive.

d) Does your health problem prevent you from travelling by bus?
   i. It doesn't stop me from getting on the bus.
   ii. I'm having a hard time getting on the bus, but it's not impossible.
   iii. I can't get on the bus without help.
   iv. I can't get on the bus.

e) Is your health problem preventing you from travelling by taxi?
   i. It doesn't stop me from getting in the taxi.
   ii. I'm having a hard time getting around in a taxi, but it's not impossible.
   iii. I can't travel in a taxi without help.

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iv. I can't travel in a taxi.

f) Does your health problem prevent you from travelling by motorbike/scooter?
   i. It doesn't stop me from riding my motorbike/scooter.
   ii. I'm having a hard time getting around on my motorbike/scooter, but it's not impossible.
   iii. I can't ride my motorbike/scooter without help.
   iv. I can't ride my motorbike/scooter.

Questions regarding access to a pharmacy

17. What is the distance of your house from the city of Trikala and how long does it take you to cover that distance, with the means you usually travel for this purpose? Means of travel: _____ Distance: ___km, Time: ___minutes
18. Where is the pharmacy you visit more often located?
19. How long does it take you to get to this pharmacy?
20. What mode do you use to get there?
21. Have you ever been to your local pharmacy for an emergency medical product and it wasn't available? If yes, was it a pharmaceutical product or it belonged to paramedic (bandages, orthopaedics, etc.)?
22. During the last three months, how many times have you urgently/exceptionally needed a pharmaceutical/paramedic product, and it was not available?
23. If it's an emergency, what do you do? Do you wait until the next day or ask a relative to go to another pharmacy in Trikala to get the medical product and bring it to you?
24. How long does it take your relatives from the moment you notify them until they bring it to you?

We would like to inform you that a pilot program for within-day transferring of pharmaceutical/paramedic material from Trikala to the pharmacy in your area, is starting.

25. Do you know what unmanned aerial flying vehicles (UAVs) are?
26. Do you know that unmanned aerial flying vehicles (UAVs) can, by air, transport products within cities?

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27. In case you go to the pharmacy in your area for some pharmaceutical/paramedic material, and it is not available, would you be interested in its transfer, from the area of Trikala to the pharmacy of your area on the same day, using an unmanned aerial flying vehicles (UAVs)?
28. Would you be interested in a service that would transport paramedic products, using an unmanned aerial flying vehicles (UAVs), to a designated distribution point or your home?

In case he/she has a smartphone and knows how to use it:

29. Would you be willing to use your smartphone to download a service and order the pharmaceutical/paramedic products you need to be delivered to you via unmanned aerial flying vehicles (UAVs)?
    - Yes
    - Not
    - I'm not sure
    - Other.....

In case he/she is old and does not know how to use smartphone:

30. Would you be willing to use the service (e.g., through the call center) to order the drug you need, to be delivered to you via unmanned aerial flying vehicles (UAVs)?
    - Yes
    - Not
    - I'm not sure
    - Other.....

Inform them about the procedure

There can be an update on the time it will take the unmanned aerial flying vehicles (UAVs) to bring the products from Trikala to the pharmacy. Also, it can be a comparison between the times it used to take with the car and how much time it takes now with the unmanned aerial flying vehicles (UAVs).

31. Would you be willing to pay for this service?
32. Could you please answer the following questions?

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	Unmanned aerial flying vehicles (UAVs)	Autonomous (driverless) delivery robots	Cargo bikes
Delivery time	1. 1.5 hours 2. 3 hours 3. 5 hours 4. same day-delivery 5. next-day delivery 6. more than 2 days		
Shipping price (independent of package price – *to be stressed during the experiment*) (in €)	1. 6 2. 8 3. 12 4. 14 5. 18 6. 22		
Delivery point choice availability	1. Home 2. Public space (such as storage locks) 3. Work		
Tracking app	• No • Regular updates • Precise location		
Delivery time window choice	• Yes • No		
Payment	1. Card-electronic 2. Through app 3. Cash only		
Weight	• Less than 0.5 kg • 0.5-1 kg • 1-2.5 kg	• Less than 0.5 kg • 0.5-1 kg • 1-2.5 kgs	• Less than 0.5 kg • 0.5-1 kg • 1-2.5 kgs

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		• 2.5-5 kgs	• 2.5-5 kgs • 5-10 kgs
Capacity of mode	• 1 package • 2 packages • 3 packages • 4 packages		

33. How long would you be willing to wait for the pharmaceutical/paramedic products you need to come?
34. Would you continue to use this service, if it was available, after the end of the trial period?
35. Would you be interested in using this program in your area on a permanent basis?
36. Does the direct transport of the drug via unmanned aerial flying vehicles (UAVs) increase your sense of safety and satisfaction with the pharmacy?
    i. No
    ii. Little
    iii. Moderate
    iv. Very
    v. A lot
37. What do you think will be the potential benefits of adopting unmanned aerial flying vehicles (UAVs) for the transportation of pharmaceutical/paramedic materials? (open answer at the beginning and then we ask the questions from the table below).

Please indicate your level of agreement for each one of the following statements, regarding your expectations of participating in the pilot survey of using unmanned aerial flying vehicles (UAVs) for the transport of pharmaceutical/paramedic materials.

The application and use of unmanned aerial flying vehicles (UAVs) will lead to:

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Faster deliveries to avoid traffic jams					
Reducing the carbon footprint					
Less fuel requirements					
No parking costs					

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Less infrastructure investments					
Decreased operating costs					
Decreased labour costs					
Improved responsiveness and efficiency in the delivery of goods					
Efficient routing of deliveries					
Efficient route adjustments using real time traffic data					
Accurate tracking of the position of unmanned aerial flying vehicles (UAVs)					

38. Please indicate your level of agreement for each one of the following statements, regarding your **concerns** in adopting unmanned aerial flying vehicles (UAVs) for the transport of pharmaceutical/paramedic materials.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
*I expect that there might be issues in the following **technical aspects***:					
Flight range					
Routing and scheduling of unmanned aerial flying vehicles (UAVs)					
Limited battery characteristics of unmanned aerial flying vehicles (UAVs)					
Limited carrying capacity					
Weather					
Inexperienced remote pilots					
*I expect that there might be issues in the following **social aspects***:					

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Public perception and acceptance					
Threat to privacy by general public					
Customer perception regarding receiving the items					
Security issues (cyber-attacks, hijacking, terrorism etc.)					
I expect that there might be issues in the following ***legal and managerial aspects***:					
Complicated regulatory framework					
Top management commitment					
Legality issues					
Commercialisation of unmanned aerial flying vehicles (UAVs)					
I expect that there might be issues in the following ***safety aspects***:					
Causing property damage					
Causing fire					
Injuring or killing someone					
Crashing into a manned aircraft					
Crashing into another unmanned aerial flying vehicles (UAVs)					

Regarding the particular circumstances due to COVID-19.

39. In a total lockdown, would you choose to receive pharmaceutical/paramedic products using an unmanned aerial flying vehicles (UAVs), to reduce your trips to pharmacies in other areas?

40. Would you feel safe flying unmanned aerial flying vehicles (UAVs) to transport drugs?
    i. No
    ii. Little
    iii. Moderate
    iv. Very
    v. A lot

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41. What do you think the potential benefits of such a service will be?
42. Would you favor unmanned aerial flying vehicles (UAVs) services that carry products other than medicines?
43. If yes, for which products (e.g., supermarket, food distribution, etc.)?

Thank you for your time.

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10.9. Trikala - Residents post-demonstration questionnaire

Appendix 9: Trikala - Residents post-demonstration questionnaire.

Residents post-demonstration questionnaire

QUESTION – RESIDENTS TO BE IMPACTED BY THE PILOT SURVEY

For people who took part in the pilot program of using unmanned aerial flying vehicles (UAVs) to transport pharmaceutical/paramedic products.

We would like to inform you that the pilot unmanned aerial flying vehicles (UAVs) program for within-day transferring of pharmaceutical/paramedic products from Trikala to the pharmacy in your area, is over.

General Questions

1. In which area is your home located?
2. What is your age?
3. What is your gender?
4. Do you have a driver's license?
5. What is your level of education?
   i. Primary School
   ii. Secondary School
   iii. High School
   iv. Degree in Higher Education
   v. Master's Degree
   vi. Ph.D. or M.D.
   vii. Other
6. What is your household's total annual income? (before tax)
   i. Under 10,000€
   ii. 10.001€ - 25.000€

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iii. 25.001€ - 50.000€
iv. 50.001€ - 75.000€
v. 75,000€ and above

7. What is your employment status?
   i. Full-time employee (30+ hours per week)
   ii. Part-time employee (less than 30 hours per week)
   iii. Full-time self-employed (30+ hours per week)
   iv. Part-time self-employed (less than 30 hours per week)
   v. Public Servant
   vi. Student
   vii. Unemployed or looking for a job
   viii. Inability to work due to long-term illness
   ix. Retired
   x. Other
8. What's your marital status?
   i. Single
   ii. Married
   iii. Divorced
   iv. Widower
9. If you are a parent, please specify how many children you have?
10. Does any of the children live with you or less than 10 minutes away from your home?
11. Is there any private vehicle or a bike/scooter available in your household? If yes, how many of each one?
12. Do you have a monthly transport card for public transport?
13. Do you have a mobile phone?
14. Is it a new generation mobile/smartphone?
15. How familiar are you with using apps from your smartphone?
   i. Not at all (I've never downloaded an app to my phone before).

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ii. Moderate, I can't install an app, but I can use it.
iii. Enough (at times I've downloaded apps to my mobile and I've used them).
iv. Too much (I frequently use my phone to access apps).

16. Do you have any health problem that limits your ability to move?

<u>If yes</u>, please answer the following questions:

g) Does the health problem you're experiencing prevent you from walking?
   i. It doesn't stop me from walking.
   ii. I'm having trouble walking, but it's not impossible.
   iii. I can't walk around without help.
   iv. I can't walk.

h) Does your health problem prevent you from travelling by bike?
   i. It doesn't stop me from riding my bike.
   ii. I'm having a hard time getting around on my bike, but it's not impossible.
   iii. I can't ride my bike without help.
   iv. I can't ride my bike.

i) Does your health problem prevent you from travelling by car?
   i. It doesn't stop me from driving.
   ii. I'm having a hard time moving around with my car, but it's not impossible.
   iii. I can't drive around without help.
   iv. I can't drive.

j) Does your health problem prevent you from travelling by bus?
   i. It doesn't stop me from getting on the bus.
   ii. I'm having a hard time getting on the bus, but it's not impossible.
   iii. I can't get on the bus without help.
   iv. I can't get on the bus.

k) Is your health problem preventing you from travelling by taxi?
   i. It doesn't stop me from getting in the taxi.

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ii. I'm having a hard time getting around in a taxi, but it's not impossible.
iii. I can't travel in a taxi without help.
iv. I can't travel in a taxi.

l) Does your health problem prevent you from travelling by motorbike/scooter?
i. It doesn't stop me from riding my motorbike/scooter.
ii. I'm having a hard time getting around on my motorbike/scooter, but it's not impossible.
iii. I can't ride my motorbike/scooter without help.
iv. I can't ride my motorbike/scooter.

Questions regarding access to a pharmacy

17. What is the distance of your house from the city of Trikala and how long does it take you to cover that distance, with the means you usually travel for this purpose? Means of travel: _____ Distance: ___km, Time: ___minutes
18. Where is the pharmacy you visit more often located?
19. How long does it take to get to this pharmacy?
20. What mode do you use to get there?
21. Have you ever been to your local pharmacy for an emergency medical product and it wasn't available? If yes, was it a pharmaceutical product or belonged to paramedics (bandages, orthopaedics, etc.)?
22. During the last three months, how many times have you urgently/exceptionally needed a pharmaceutical/paramedic product, and it was not available?
23. If it's an emergency, what do you do? Do you wait until the next day or ask a relative to go to another pharmacy in Trikala to get the medical product and bring it to you?
24. How long does it take your relatives from the moment you notify them until they bring it to you?

We would like to inform you that the pilot program for within-day transferring pharmaceutical/paramedic materials from Trikala to the pharmacy in your area, was completed. Can you tell us about the experience you gained from this service?

25. Do you know what unmanned aerial flying vehicles (UAVs) are?
26. Do you know that unmanned aerial flying vehicles (UAVs) can, by air, transport products within cities?

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27. Did it happen, during the trial period of the program, to go to the pharmacy in your area for some pharmaceutical/paramedic material and it was not available? If yes, was it transferred from the Trikala area to your local pharmacy on the same day, using an unmanned aerial flying vehicles (UAVs)?
28. After your experience, would you be interested in a service that would transport paramedic, using an unmanned aerial flying vehicles (UAVs), to a designated distribution point or to your home?

In case he/she has a smartphone and knows how to use it:

29. Would you be willing to use your smartphone to download a service and order the pharmaceutical/paramedic products you need to be delivered to you via unmanned aerial flying vehicles (UAVs)?
    - Yes
    - Not
    - I'm not sure
    - Other.....

In case he/she is old and does not know how to use smartphone:

30. Would you be willing to use the service (e.g., through the call center) to order the drug you need, to be delivered to you via unmanned aerial flying vehicles (UAVs)?
    - Yes
    - Not
    - I'm not sure
    - Other.....

Perceptions and observations about unmanned aerial flying vehicles (UAVs) after their pilot use in your area.

It can be a comparison between the times it used to take with the car and how much time it takes now with the unmanned aerial flying vehicles (UAVs).

31. Please rate your level of satisfaction with the unmanned aerial flying vehicles (UAVs) demonstration:
    a. Very unsatisfied
    b. Unsatisfied
    c. Neutral
    d. Satisfied

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e. Very satisfied

32. Would you be willing to pay for this service?

33. Could you please answer the following questions?

	Unmanned aerial flying vehicles (UAVs)	Autonomous (driverless) delivery robots	Cargo bikes
Delivery time	1. 1.5 hours 2. 3 hours 3. 5 hours 4. same day-delivery 5. next-day delivery 6. more than 2 days		
Shipping price (independent of package price – *to be stressed during the experiment*) (in €)	1. 6 2. 8 3. 12 4. 14 5. 18 6. 22		
Delivery point choice availability	1. Home 2. Public space (such as storage locks) 3. Work		
Tracking app	• No • Regular updates • Precise location		
Delivery time window choice	• Yes • No		
Payment	1. Card-electronic 2. Through app 3. Cash only		

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Weight	• Less than 0.5 kg • 0.5-1 kg • 1-2.5 kg	• Less than 0.5 kg • 0.5-1 kg • 1-2.5 kgs • 2.5-5 kgs	• Less than 0.5 kg • 0.5-1 kg • 1-2.5 kgs • 2.5-5 kgs • 5-10 kgs
Capacity of mode	• 1 package • 2 packages • 3 packages • 4 packages		

34. In case you used the service, how long did you wait for the pharmaceutical/paramedic product you needed to come?
35. Would you continue to use this service, if it was available, after the end of the trial period?
36. Would you be interested in using this program in your area on a permanent basis?
37. Does the direct transport of the drug via unmanned aerial flying vehicles (UAVs) increase your sense of safety and satisfaction with the pharmacy?
    i. No
    ii. Little
    iii. Moderate
    iv. Very
    v. A lot
38. Following the pilot use of unmanned aerial flying vehicles (UAVs) that took place in your area, what do you think will be the potential benefits of adopting unmanned aerial flying vehicles (UAVs) for the transportation of pharmaceutical/paramedic materials? (free answer at the beginning and then ask the questions from the table below).

Please indicate your level of agreement for each of the following statements, after your participation in the pilot use of an unmanned aerial flying vehicles (UAVs) for the transport of pharmaceutical/paramedic materials.

The application and use of unmanned aerial flying vehicles (UAVs) will lead to:

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	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Faster deliveries to avoid traffic jams					
Reducing the carbon footprint					
Less fuel requirements					
No parking costs					
Less infrastructure investments					
Decreased operating costs					
Decreased labour costs					
Improved responsiveness and efficiency in the delivery of goods					
Efficient routing of deliveries					
Efficient route adjustments using real time traffic data					
Accurate tracking of the position of unmanned aerial flying vehicles (UAVs)					

39. Please indicate your level of agreement for each one of the following statements, regarding your **concerns** in adopting unmanned aerial flying vehicles (UAVs) for the transport of pharmaceutical/paramedic materials.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I expect that there might be issues in the following ***technical aspects***:					
Flight range					
Routing and scheduling of unmanned aerial flying vehicles (UAVs)					

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Limited battery characteristics of unmanned aerial flying vehicles (UAVs)					
Limited carrying capacity					
Weather					
Inexperienced remote pilots					
I expect that there might be issues in the following ***social aspects***:					
Public perception and acceptance					
Threat to privacy by general public					
Customer perception regarding receiving the items					
Security issues (cyber-attacks, hijacking, terrorism etc.)					
I expect that there might be issues in the following ***legal and managerial aspects***:					
Complicated regulatory framework					
Top management commitment					
Legality issues					
Commercialisation of unmanned aerial flying vehicles (UAVs)					
I expect that there might be issues in the following ***safety aspects***:					
Causing property damage					
Causing fire					
Injuring or killing someone					
Crashing into a manned aircraft					
Crashing into another unmanned aerial flying vehicles (UAVs)					

Regarding the particular circumstances due to COVID-19.

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40. In a total lockdown, would you choose to receive pharmaceutical/paramedic products using an unmanned aerial flying vehicles (UAVs), to reduce your trips to pharmacies in other areas?
41. Would you feel safe flying unmanned aerial flying vehicles (UAVs) to transport drugs?
    vi. No
    vii. Little
    viii. Moderate
    ix. Very
    x. A lot
42. After the pilot use of the unmanned aerial flying vehicles (UAVs) service carried out in your area, what do you think the potential benefits of such a service will be?
43. Would you favor unmanned aerial flying vehicles (UAVs) services that carry products other than medicines?
44. If yes, for which products (e.g., supermarket, food distribution, etc.)?

Thank you for your time.

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10.10. Online questionnaire for residents of Trikala's municipality

Appendix 10: Online questionnaire for residents of Trikala's municipality.

Online questionnaire for residents of Trikala's municipality

Question	Response options - Oxford
Page 1: Socio-economic characteristics	
In which area do you live?	Trikala They will provide us with this information later
How old are you?	[NF 16-110]
What is your gender?	Male Female Other Prefer not to answer
What is the highest degree or level of education you completed?	Primary school diploma Secondary school diploma High school diploma Bachelor's degree Master's degree Doctoral degree (Ph.D. or M.D.) Other

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What is your employment status?	Full time paid employment (40 hours a week) Part-time paid employment (less than 30 hours a week) Full time self-employment (40 hours a week) Part time self-employment (less than 30 hours a week) Public servant Student Unemployed or looking for work Unable to work because of long-term illness or disability Retired Other
Which of the following best describes your working schedule?	Fixed work schedule Flexible work schedule - with flexibility in finish times only Flexible work schedule - with flexibility in start times only Flexible work schedule - with flexibility in both start and finish times Rotating shift work schedule
Do you always work in the same place or work at multiple locations? (If you both work from home and work on site, please only consider the work performed outside of you home)	No Yes
How many days in an average week do you: **- work from home?** **- travel to work?**	None 1 day 2 days

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	3 days 4 days 5 days More than 5 days
What is your marital status?	Single Married/Civil partnered Divorced Widowed
Including yourself, how many people live in your household?	[NF 1-12]
Who else lives in your household? Please select all that apply.	Spouse/Partner Parent(s) or parent(s)-in-law Child(ren) Grandchild(ren) Other relative Live-in domestic helper Other non-relative/roommate/housemate Prefer not to answer
How many children do you have?	[NF 1-12]
How many children between the age of 0 to 12, live with you?	[NF 0-12]
How many children between the age of 13 to 18, live with you?	[NF 0-12]

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Thinking about all sources of income such as salary/wages, benefits, pensions and so on, which numbers best represent the total annual income of your household before taxes and other deductions?	Under 10,000€ 10,000€ - 25,000€ 25,001€ - 50,000€ 50,001€ - 75,000€ 75,000 or more Prefer not to answer/Don't Know
How many people in your household are employed (including full-time, part-time and self-employed)?	<=hh_size
How many people in your household are holding valid driving licences?	<=hh_size
Do you hold any of these types of driving licences? Please check all that apply if licence is currently valid	No (exclusive option) Full licence - car Full licence – motorcycle or scooter
What type of dwelling are you currently living at?	Terrace house Semi-detached house Detached house Bungalow Converted flat Purpose built flat (less than 6 storeys high) Purpose built flat (at least 6 storeys high)
	Less than 0.5 km

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How far are the following places away from your home? **- Nearest bus** **- Nearest grocery store** **- Nearest park/green space**	0.5-1 km 1-2 km 2-3 km 3-5 km 5-7 km 7-10 km More than 10 km
Page 2: Travel behaviour information	
How many cars does your household own or has access?	0 1 2 3 3+
Does your household have access to a leased car or company car?	No Yes
Are you the main driver of any of these cars?	No - I do not have regular access to any cars Yes - but I shared a car with other household members Yes
For the vehicle you are the main user, please reply to the follow questions	
What kind of vehicle is it?	Hatchback Estate SUV Saloon

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	Coupe Convertible MPV Pickup
What type of fuel does your vehicle use?	Petrol Diesel Compressed natural gas (CNG) Liquefied petroleum gas (LPG) hybrid Plug-in hybrid Electric Other energy souse (e.g., ethanol, hydrogen)
What is the level of driving automation?	**Level 0** : **You <u>are</u> driving** whenever these driver support features are engaged - even if your feet are off the pedals and you are not steering. **You must constantly supervise** these support features: you must steer, brake or accelerate as needed to maintain safety. These features **are limited** to providing warnings and momentary assistance. For example: automatic emergency braking, blind spot warning, lane departure warning.

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Level 1 : **You <u>are</u> driving** whenever these driver support features are engaged - even if your feet are off the pedals and you are not steering. **You must constantly supervise** these support features: you must steer, brake or accelerate as needed to maintain safety. These features provide steering **OR** brake/acceleration support to the driver. For example: lane centering **OR** adaptive cruise control.

Level 2 : **You <u>are</u> driving** whenever these driver support features are engaged - even if your feet are off the pedals and you are not steering. **You must constantly supervise** these support features: you must steer, brake or accelerate as needed to maintain safety. These features provide steering **AND** brake/acceleration support to the driver. For example: lane centering **AND** adaptive cruise control at the same time)

Level 3 : **You <u>are not</u> driving** when these automated driving features are engaged - even if you are seated in "the driver's seat". When the feature requests **you must drive**. These features can drive the vehicle under limited conditions and will not operate unless all required conditions are met. For example: traffic jam chauffeur.

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	Level 4 : **You <u>are not</u> driving** when these automated driving features are engaged - even if you are seated in "the driver's seat". These automated driving features will not require you to take over driving. These features can drive the vehicle under limited conditions and will not operate unless all required conditions are met. For example: local driverless taxi, pedals/steering wheel may or may not be installed.
What is the brand of your car? Please select all that apply.	See sheet "Car_brand_drop_down"
What are the cubic meters of your vehicle's engine?	[NF 800-8000]
How far is the driving range of this car?	Less than 150 kilometres 150-250 kilometres 250-350 kilometres 350-500 kilometres 500-750 kilometres 750-1000 kilometres Above 1000 kilometres
How old is this car (in terms of registration year)?	 0-2 years old 3-5 years old 6-8 years old 9-11 years old 12 years old and above

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How about the seat capacity of this car?	Less than 4 seats 4 seats 5 seats 6-8 seats
What is the annual vehicle mileage travelled (VMT) of this car?	Below 3,000 km 3,000-4,999 km 5,000-6,999 km 7,000-8,999 km 9,000-10,999 km 11,000-12,999 km 13,000-14,999 km 15,000 km or more
How much is the annual fuel cost?	Less than 600€ 600€-999€ 1000€-1,399€ 1,400€-1,799€ 1,800€ or more
How much is the annual maintenance cost?	Less than 200€ 200€-399€ 400€-599€ 600€-799€ 800€ or more

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How much did this car cost you for purchase?	Under 10,000€ 10,000€-19,999€ 20,000€-29,999€ 30,000€-39,999€ 40,000€-59,999€ 60,000€-79,999€ 80,000€ or more
How far is the average refuel/recharging distance of this car?	15km 25km 50km 75km 100km
How often do you use this vehicle?	Never Once in a fortnight A Couple of times per week 3-4 times a week Once per day Several times per day
Have you subscribed for car sharing services?	No Yes
Where do you usually park the vehicle while at home? Please select all that apply.	On street - resident scheme On street - metered On street - other

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	Off street - public other Off street - private residential Off street - private non- residential
How many motorcycles does your household own?	[NF 0-12]
Have you subscribed for motorcycle sharing services?	No Yes
How many electric-scooter does your household own?	[NF 0-12]
Have you subscribed for electric-scooter sharing services?	No Yes
How many bicycles does your household own?	[NF 0-12]
Have you subscribed for bike sharing services?	No Yes
Do you use taxi for your trips?	No Yes
Do you use public transports (e.g., bus)?	No Yes
Do you have a monthly pass for public transport modes?	No Yes
What is the duration of your public pass?	Weekly Monthly Yearly

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Do you own a smartphone?	No Yes
How familiar are you with using smartphones and especially using smart apps from your mobile?	Not at all (I've never downloaded an app to my phone before) A little bit Moderate; I can't install an app but I can use it Enough (at time I have downloaded apps to my mobile phone and I have used them A lot (I constantly use my phone to download apps)
How would you rate your dependence on using smartphone apps to check travel information (e.g., mode, route, travel time) before and during a trip in the UK/ Italy?	Not at all Slightly Somewhat Moderately Extremely
What do you mainly use travel apps for? Please check all that apply	I don't use travel apps Planning trips (e.g., check routes, mode, departure time) Navigation Checking other real-time information, e.g., travel time, road congestion Buying mobility services (e.g., buy train tickets through train apps) Contactless payment for mobility services

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How many one-way trips did you make in an average week by: **Please note that:** **• One-way trip describes travelling from an origin to a destination, e.g. commuting for work consists of two one-way trips - one there and one home.** **• If more than one method of transport is involved in an one-way trip, please count them separately** **- Bus** **- Private car as a driver <only shown to licenced respondents with at least one car>** **- Private car as a passenger <only shown to respondents with at least one car>** **- Taxi** **- Cycling**	[NF 0-100]
How do you rate your general satisfaction with travelling by: **- Bus** **- Train** **- Private car as a driver** **- Private car as a passenger <only shown to phhcar>0>** **- Taxi** **- Cycling**	Extremely dissatisfied Somewhat dissatisfied Neither satisfied not dissatisfied Somewhat satisfied Extremely satisfied

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How long is your commute distance (one-way)?	Less than 5 km 5-10 km 10-15 km 15-20 km 20-30 km 30-40 km 40-50 km 50-60 km More than 60 km
How long does it normally take to get to your place of work/education from your home?	Less than 10min 10-20min 20-30min 30-45min 45-60min 1-1.5h Longer than 1.5h
Which mode do you usually use to get to your place of work/education?	Private car as a passenger Private car as a driver Public transport (e.g., bus) Taxi Bike Walk all the way
	City centre

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How would you describe the area type of your residential location?	Suburban Rural
Do you have any long-term physical or health issue that limits your ability to travel and get around?	Yes No Prefer not to answer
How easy or difficult is to use the below transport modes?	
Bus	Impossible without help Difficult (but not impossible) Easy to use I do not have the experience
Metro	Impossible without help Difficult (but not impossible) Easy to use I do not have the experience
Car	Impossible without help Difficult (but not impossible) Easy to use I do not have the experience
Taxi	Impossible without help Difficult (but not impossible) Easy to use I do not have the experience

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Cycling	Impossible without help Difficult (but not impossible) Easy to use I do not have the experience
Walking	Impossible without help Difficult (but not impossible) Easy to use I do not have the experience
Page 3: Access to pharmacies	
What is the distance of your home from the city of Trikala?	2 - 4 km 5 - 7 km 8 - 10 km 11 km or more
How long do you need to cover this distance by car?	less than 10 minutes 11 to 20 minutes 21 to 30 minutes 31 minutes or more
What means of transport do you use to go to your local pharmacy?	I am walking I use my personal car A relative person is transporting me with his/her car A friendly person is transporting me with his/her car I use public transport I am taking a taxi

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How long does it take you to get to your local pharmacy?	[NF 1-60]
Have you ever been to your local pharmacy for an emergency medical product and it wasn't available?	No Yes
Was it a pharmaceutical product or it belonged to paramedics (bandages, orthopaedics, etc.)?	Pharmaceutical product Paramedic product
During the last three months, how many times have you urgently/exceptionally needed a pharmaceutical/paramedic product and it was not available?	1 time 2 times 3 times 4 times 5 times or more
If getting a pharmaceutical/paramedic product is urgent and not available at your local pharmacy, what do you do?	Wait until the next day when the pharmacist brings it Driving with me car to the next nearest pharmacy Ask a relative person or friend to go to another pharmacy Go to a pharmacy in another area
How long does it take your relative person or friend, from the moment you notify them until they bring it to you?	[NF 1-60]
Page 4: Use of unmanned aerial flying vehicles (UAVs)	
Do you know what unmanned aerial flying vehicles (UAVs) are?	No Yes
Do you know that unmanned aerial flying vehicles (UAVs) can, by air, transport products within cities?	No Yes

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In case you go to the pharmacy in your area for some pharmaceutical/paramedics material, and it is not available, would you be interested in transferring it, from the area of Trikala to the pharmacy of your area on the same day, using an unmanned aerial flying vehicles (UAVs)?	No Yes
Would you be willing to use your smartphone to download a service and order the pharmaceutical/paramedics products you need to deliver it to you via unmanned aerial flying vehicles (UAVs)?	No Yes I am not sure Other
How long would you be willing to wait for the pharmaceutical/paramedics products you need to come?	less than 10 minutes 11 to 20 minutes 21 to 30 minutes 31 minutes or more
Would you be willing to pay for this service?	No Yes
What additional amount would you be willing to give?	less than 1€ Up to 2€ Up to 3€ Up to 4€ 5€ or more
Do you think the extra cost should be absorbed by the pharmacy in your area?	No Yes

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Would you continue to use this service, if it was available, and after the end of the trial period?	No Yes
Would you be interested in using this program in your area on a permanent basis?	No Yes
Does the direct transport of the drug via unmanned aerial flying vehicles (UAVs) increase your sense of safety and satisfaction with the pharmacy?	No Little Moderate Very A lot

What do you think will be the potential benefits of adopting unmanned aerial flying vehicles (UAVs) in the transportation of pharmaceutical/paramedics materials?

Please indicate your level of agreement for each one of the following items, regarding your expectations of participating in the pilot survey of using unmanned aerial flying vehicles (UAVs) for the transport of pharmaceutical/paramedics materials.

The application and use of unmanned aerial flying vehicles (UAVs) will lead to:

Faster deliveries to avoid traffic jams **Reducing the carbon footprint** **Less fuel requirements**	1=Strongly disagree 2=Disagree 3=Neutral

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No parking costs **Less infrastructure investments** **Decreased operating costs** **Decreased labour costs** **Improved responsiveness and efficiency in the delivery of goods** **Efficient routing of deliveries** **Efficient route adjustments using real time traffic data** **Accurate tracking of the position of unmanned aerial flying vehicles (UAVs)**	4=Agree 5=Strongly agree
Please indicate your level of agreement for each one of the following items, regarding your concerns in adopting unmanned aerial flying vehicles (UAVs) for the transport of pharmaceutical/paramedics materials.	
I expect that there might be issues in the following **technical aspects:**	
Flight range **Routing and scheduling of unmanned aerial flying vehicles (UAVs)** **Limited battery characteristics of unmanned aerial flying vehicles (UAVs)** **Limited carrying capacity** **Weather** **Inexperienced remote pilots**	1=Strongly disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly agree

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I expect that there might be issues in the following **social aspects:**	
Public perception and acceptance **Threat to privacy by general public** **Customer perception regarding receiving the items** **Security issues (cyber-attacks, hijacking, terrorism etc.)**	1=Strongly disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly agree
I expect that there might be issues in the following **legal and managerial aspects:**	
Complicated regulatory framework **Top management commitment** **Legality issues** **Commercialisation of unmanned aerial flying vehicles (UAVs)**	1=Strongly disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly agree
I expect that there might be issues in the following **safety aspects:**	
Causing property damage **Causing fire** **Injuring or killing someone** **Crashing into a manned aircraft**	1=Strongly disagree 2=Disagree 3=Neutral

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Crashing into another unmanned aerial flying vehicles (UAVs)	4=Agree 5=Strongly agree
Page 5: Attitudes regarding COVID-19.	
Attitudes regarding COVID and other health issues	
Due to the ongoing/past pandemic I would avoid crowded public transport vehicles I am more worried about my health than most people around me The COVID-19 situation has greatly affected my mental health The COVID-19 situation has greatly affected my physical health I would avoid sharing a vehicle with an unknown person due to health concerns	1 = Strongly disagree 2 = Disagree 3 = Neither disagree nor agree" 4 = Agree 5 = Strongly agree
In a total lockdown, would you choose to deliver pharmaceutical/paramedics products using a unmanned aerial flying vehicles (UAVs), to reduce your transport to pharmacies in other areas?	No Yes
Would you feel safe unmanned aerial flying vehicles (UAVs) to transport pharmaceutical/paramedics products?	No Little

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Moderate
Very
A lot

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10.11. AV pre-demonstration freight stakeholders survey for Oxfordshire and Rotterdam

Appendix 11: AV pre-demonstration freight stakeholders survey for Oxfordshire and Rotterdam.

AV pre-demonstration freight stakeholders survey

Dear respondent,

As part of the HARMONY project, a few demonstrations will take place testing autonomous vans in freight operations. This survey aims at investigating freight stakeholders' views about their:

1. Motivation behind participating in the Autonomous Van demonstration.
2. Expectations regarding the Autonomous Van demonstration.
3. Concerns and barriers for adopting Autonomous Vans in freight operations.

All the information you provide will be aggregated, handled anonymously and used only for research purposes.

For any concerns or suggestions, please do not hesitate to contact us via email: c.georgouli@ucl.ac.uk, I.Kourounioti-1@tudelft.nl

On behalf of the HARMONY team, thank you very much for your participation!

PART I: Stakeholder Details

1. Which organisation/company are you working for?

2. What is your job title?

3. How many years of experience do you have in the sector you are working for?
   - Less than 1 year
   - 1-2 years
   - 2-5 years

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- 5-10 years
- More than 10 years

4. Please indicate your age
   - 18-24
   - 25-30
   - 31-35
   - 36-40
   - 41-45
   - 45-50
   - 51-55
   - 56-60
   - 61-65
   - More than 66
   - Prefer not to answer

5. Please indicate your gender
   - Male
   - Female
   - Other
   - Prefer not to answer

PART II: Motivation

6. What is your company/organisation motivation for agreeing to participate in the AV demonstration?

Examples of potential responses and questions for the interviewer or multiple-choice options: approached by Municipality of Rotterdam – Oxfordshire, good business relation with one of the organising companies, interest for an AV application, looking actively to increase the efficiency (environmental or operational efficiency).

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PART III: Expectations and concerns

7. How likely do you consider Autonomous Vans to be part of freight operations in the following time horizons?

	Very unlikely	**Unlikely**	**Neutral**	**Likely**	**Very likely**
Before 2025					
Before 2030					
Before 2050					
After 2050					

8. Please indicate the level of agreement for each one of the following items regarding your **expectations from participating** in the AV demonstration.

The implementation of Autonomous Vans will lead to:

	Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
Less waiting time in congestion					
Increased road safety					
Efficient and safe parking of vehicles					
Higher efficiency in the loading and unloading operations					
A greener vehicle fleet					
Efficient routing of vehicles					
Improved logistics operations					
Efficient route adjustments using real time traffic data					
The provision of more accurate data on distance travelled and speed					

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Accurate tracking of the position of Autonomous Vans					
Decreased labour costs					
Decreased operational costs					

9. Please indicate the level of agreement for each one of the following items regarding your **concerns** in adopting Autonomous Vans.

	Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
*I expect that there might be issues in the following **technical aspects***:					
With the ability of the AV to communicate with the road infrastructure					
With the ability of the AV to communicate with pedestrians					
With the ability of the AV to communicate with cyclists					
With the ability of the AV to communicate with car traffic					
With the reaction of the AV in case of deviations in traffic flow					
With the ability of the AV to detect available loading and unloading spots					
With the ability of the AV to park					
With the ability of the AV to interact with the driver					
*I expect that there might be issues in the following **operational aspects**:*					

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With the reaction of the AV in case of missing or occupied loading/unloading bays					
With the reaction of the AV in case of several recipients in one trip					
With the ability of the AV to select the correct package					
With the speed of the AV operation compared to traditional vehicles					
*I expect that there might be issues in the following **legal aspects**:*					
With the compliance of the AV to the legal requirements					
With the lack of AV regulations in urban freight operations					
With the liability in case of an incident					
*I expect that there might be issues in the following **technology aspects**:*					
With the security against cyber attacks (of the vehicle or packages)					
With the security regarding data privacy					
With the availability of real-time data for information and communication purposes					

Thank you for your participation!

In case you are interested to be informed about the outcomes of the survey please provide us with your email:

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10.12. AV post-demonstration freight stakeholders survey for Oxfordshire and Rotterdam

Appendix 12: AV post-demonstration freight stakeholders survey for Oxfordshire and Rotterdam.

AV post-demonstration freight stakeholders survey

Dear respondent,

As part of the HARMONY project, a few demonstrations took place testing autonomous vans in freight operations. This survey aims at investigating freight stakeholders' views about:

1. Satisfaction levels following the Autonomous Van demonstration.
2. Expectations regarding Autonomous Vans following the demonstration.
3. Concerns and barriers for adopting Autonomous Vans in freight operations.

All the information you provide will be aggregated, handled anonymously and used only for research purposes.

For any concerns or suggestions, please do not hesitate to contact us via email: c.georgouli@ucl.ac.uk, I.Kourounioti-1@tudelft.nl

On behalf of the HARMONY team, thank you very much for your participation!

PART I: Expectations and concerns

1. Please rate your level of satisfaction with the AV demonstration:
    a. Very satisfied
    b. Satisfied
    c. Neutral
    d. Unsatisfied
    e. Very unsatisfied

2. Please justify your response in Question 1:

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Examples for the interviewer (weak and strong points of the pilot, what went well, what could be improved, and what are the areas of concerns).

3. After your participation in the AV demonstration how likely do you consider Autonomous Vans to be part of freight operations in the following time horizons?

	Very unlikely	**Unlikely**	**Neutral**	**Likely**	**Very likely**
Before 2025					
Before 2030					
Before 2050					
After 2050					

4. Following the AV demonstration that took place in your area, please specify the level of agreement for each one of the following items.

The implementation of Autonomous Vans will lead to:

	Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
Less waiting time in congestion					
Increased road safety					
Efficient and safe parking of vehicles					
Higher efficiency in the loading and unloading operations					
A greener vehicle fleet					
Efficient routing of vehicles					
Improved logistics operations					
Efficient route adjustments using real time traffic data					
The provision of more accurate data on distance travelled and speed					

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Accurate tracking of the position of Autonomous Vans					
Decreased labour costs					
Decreased operational costs					

5. Please indicate the level of agreement for each one of the following items regarding your **concerns** in adopting Autonomous Vans.

	Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
*I expect that there might be issues in the following **technical aspects***:					
With the ability of the AV to communicate with the road infrastructure					
With the ability of the AV to communicate with pedestrians					
With the ability of the AV to communicate with cyclists					
With the ability of the AV to communicate with car traffic					
With the reaction of the AV in case of deviations in traffic flow					
With the ability of the AV to detect available loading and unloading spots					
With the ability of the AV to park					
With the ability of the AV to interact with the driver					
*I expect that there might be issues in the following **operational aspects**:*					

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With the reaction of the AV in case of missing or occupied loading/unloading bays					
With the reaction of the AV in case of several recipients in one trip					
With the ability of the AV to select the correct package					
With the speed of the AV operation compared to traditional vehicles					
*I expect that there might be issues in the following **legal aspects**:*					
With the compliance of the AV to the legal requirements					
With the lack of AV regulations in urban freight operations					
With the liability in case of an incident					
*I expect that there might be issues in the following **technology aspects**:*					
With the security against cyber-attacks (of the vehicle or packages)					
With the security regarding data privacy					
With the availability of real-time data for information and communication purposes					

Thank you for your participation!

In case you are interested to be informed about the outcomes of the survey please provide us with your email:

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10.13. Unmanned aerial flying vehicles (UAVs) pre-demonstration stakeholders survey for Oxfordshire

Appendix 13: Unmanned aerial flying vehicles (UAVs) pre-demonstration stakeholders survey for Oxfordshire.

Unmanned aerial flying vehicles (UAVs) pre-demonstration stakeholders survey

Dear respondent,

As part of the HARMONY project, a demonstration will take place testing Unmanned Aerial Vehicles (unmanned aerial flying vehicles (UAVs)) in freight operations in Oxfordshire. This survey aims at investigating stakeholders' views about their:

1. Motivation behind participating in the unmanned aerial flying vehicles (UAVs) demonstration.
2. Expectations regarding the unmanned aerial flying vehicles (UAVs) demonstration.
3. Concerns and barriers for adopting unmanned aerial flying vehicles (UAVs) in freight operations.

All the information you provide will be aggregated, handled anonymously and used only for research purposes.

For any concerns or suggestions, please do not hesitate to contact us via email: c.georgouli@ucl.ac.uk

On behalf of the HARMONY team, thank you very much for your participation!

PART I: Stakeholder Details

1. Which organisation/company are you working for?

2. What is your job title?

3. How many years of experience do you have in the sector you are working for?
   - Less than 1 year
   - 1-2 years
   - 2-5 years

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- 5-10 years
- More than 10 years

4. Please indicate your age
   - 18-24
   - 25-30
   - 31-35
   - 36-40
   - 41-45
   - 45-50
   - 51-55
   - 56-60
   - 61-65
   - More than 66
   - Prefer not to answer

5. Please indicate your gender
   - Male
   - Female
   - Other
   - Prefer not to answer

PART II: Motivation

6. What is your company/organisation motivation for agreeing to participate in the unmanned aerial flying vehicles (UAVs) demonstration?

Examples of potential responses and questions for the interviewer or multiple-choice options: approached by Municipality of Oxfordshire, good business relation with one of the organising companies, interest for a unmanned aerial flying vehicles (UAVs) application, looking actively to increase the efficiency (environmental or operational efficiency).

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PART III: Expectations and Concerns

7. How likely do you consider unmanned aerial flying vehicles (UAVs) to be part of freight operations in the following time horizons?

	Very unlikely	**Unlikely**	**Neutral**	**Likely**	**Very likely**
Before 2025					
Before 2030					
Before 2050					
After 2050					

8. Please indicate the level of agreement for each one of the following items regarding your **expectations from participating** in the unmanned aerial flying vehicles (UAVs) demonstration.

The implementation of unmanned aerial flying vehicles (UAVs)will lead to:

	Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
Faster deliveries by avoiding traffic congestion					
A reduction of carbon footprint					
Less fuel requirements					
No parking costs					
Less infrastructure investments					
Decreased operational costs					
Decreased labour costs					
Improved responsiveness and efficiency in the delivery of goods					
Efficient routing of deliveries					

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Efficient route adjustments using real time traffic data					
Accurate tracking of the position of unmanned aerial flying vehicles (UAVs)					

9. Please indicate the level of agreement for each one of the following items regarding your **concerns** in adopting unmanned aerial flying vehicles (UAVs).

	Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
*I expect that there might be issues in the following **technical aspects***:					
Flight range					
Routing and scheduling of unmanned aerial flying vehicles (UAVs)					
Limited battery characteristics of unmanned aerial flying vehicles (UAVs)					
Limited carrying capacity					
Weather					
Inexperienced remote pilots					
*I expect that there might be issues in the following **social aspects***:					
Public perception and acceptance					
Threat to privacy by general public					
Customer perception regarding receiving the items					
Security issues (cyber-attacks, hijacking, terrorism etc.)					
*I expect that there might be issues in the following **legal and managerial aspects***:					
Complicated regulatory framework					

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Top management commitment					
Legality issues					
Commercialisation of unmanned aerial flying vehicles (UAVs)					
I expect that there might be issues in the following ***safety aspects***:					
Causing property damage					
Causing fire					
Injuring or killing someone					
Crashing into a manned aircraft					
Crashing into another unmanned aerial flying vehicles (UAVs)					

Thank you for your participation!

In case you are interested to be informed about the outcomes of the survey please provide us with your email:

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10.14. Unmanned aerial flying vehicles (UAVs) post-demonstration stakeholders survey for Oxfordshire.

Appendix 14: Unmanned aerial flying vehicles (UAVs) pre-demonstration stakeholders survey for Oxfordshire.

Unmanned aerial flying vehicles (UAVs) **post-demonstration stakeholders survey**

Dear respondent,

As part of the HARMONY project, a demonstration took place testing Unmanned Aerial Vehicles (unmanned aerial flying vehicles (UAVs)) in freight operations in Oxfordshire. This survey aims at investigating stakeholders' views about their:

1. Satisfaction levels and expectations following the unmanned aerial flying vehicles (UAVs) demonstration.
2. Concerns and barriers for adopting unmanned aerial flying vehicles (UAVs)in freight operations.

All the information you provide will be aggregated, handled anonymously and used only for research purposes.

For any concerns or suggestions, please do not hesitate to contact us via email: c.georgouli@ucl.ac.uk

On behalf of the HARMONY team, thank you very much for your participation!

PART I: Satisfaction levels and Expectations

1. Please rate your level of satisfaction with the unmanned aerial flying vehicles (UAVs) demonstration:
    a. Very satisfied
    b. Satisfied
    c. Neutral
    d. Unsatisfied
    e. Very unsatisfied

2. Please justify your response in Question 1:
    Examples for the interviewer (weak and strong points of the pilot, what went well, what could be improved, and what are the areas of concerns).

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3. Following the unmanned aerial flying vehicles (UAVs) demonstration, how likely do you consider unmanned aerial flying vehicles (UAVs)to be part of freight operations in the following time horizons?

	Very unlikely	**Unlikely**	**Neutral**	**Likely**	**Very likely**
Before 2025					
Before 2030					
Before 2050					
After 2050					

4. Following the unmanned aerial flying vehicles (UAVs) demonstration that took place in your area, please indicate the level of agreement for each one of the following items.

The implementation of unmanned aerial flying vehicles (UAVs)will lead to:

	Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
Faster deliveries by avoiding traffic congestion					
A reduction of carbon footprint					
Less fuel requirements					
No parking costs					
Less infrastructure investments					
Decreased operational costs					
Decreased labour costs					
Improved responsiveness and efficiency in the delivery of goods					
Efficient routing of deliveries					

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Efficient route adjustments using real time traffic data					
Accurate tracking of the position of unmanned aerial flying vehicles (UAVs)					

PART II: Concerns

5. Please indicate the level of agreement for each one of the following items regarding your **concerns** in adopting unmanned aerial flying vehicles (UAVs).

	Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
*I expect that there might be issues in the following **technical aspects***:					
Flight range					
Routing and scheduling of unmanned aerial flying vehicles (UAVs)					
Limited battery characteristics of unmanned aerial flying vehicles (UAVs)					
Limited carrying capacity					
Weather					
Inexperienced remote pilots					
*I expect that there might be issues in the following **social aspects***:					
Public perception and acceptance					
Threat to privacy by general public					
Customer perception regarding receiving the items					
Security issues (cyber-attacks, hijacking, terrorism etc.)					
*I expect that there might be issues in the following **legal and managerial aspects***:					

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Complicated regulatory framework					
Top management commitment					
Legality issues					
Commercialisation of unmanned aerial flying vehicles (UAVs)					
*I expect that there might be issues in the following **safety aspects***:					
Causing property damage					
Causing fire					
Injuring or killing someone					
Crashing into a manned aircraft					
Crashing into another unmanned aerial flying vehicles (UAVs)					

Thank you for your participation!

In case you are interested to be informed about the outcomes of the survey please provide us with your email:

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10.15. Consent Form for interview participants

Appendix 15: Consent Form for interview participants.

Consent Form for interview participants

Consent Form for interview participants

Title of Study: HARMONY Data collection tools for passenger and freight surveys
Name and Contact Details of the Researcher(s): .....

Thank you for considering taking part in this research. Before starting, you need to consent to participate in the study. Please tick each box next to each of the following to show that you agree. By not giving consent for any one element you may be deemed ineligible for the study.

Participant's statement:

I confirm that:

I have read and understood the Participant Information Sheet for the study. I have had an opportunity to consider the information and what will be expected of me. I have also had the opportunity to ask questions which have been answered to my satisfaction. ☐

I understand that participation is entirely voluntary. If I decide I no longer wish to take part in this research I can withdraw at any time before submitting the answers to the survey or the interview, without giving a reason, and any data I have provided will not be used. ☐

I understand that the interview session will be recorded, and that the transcript will be used for assisting in the data collection process, and for research purposes only. ☐

I understand that my data gathered in this study will be stored anonymously and securely. It will not be possible to identify me in any publications. ☐

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I understand the direct/indirect benefits of participating. ☐

I understand that the data will not be made available to any commercial organisations but is solely the responsibility of the researchers undertaking this study. ☐

I understand that I will not benefit financially from this study or from any possible outcome it may result in the future. ☐

I am aware of who I should contact if I wish to lodge a complaint. ☐

Name and Surname:
Signature:
Date:

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10.16. Stated preference scenarios (SPs)

Appendix 16: Stated preference scenarios (SPs).

Stated preference scenarios (SPs).

All the SPs can be found in the attached excel file with name “SPs_D3.1”.

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