



## **A Cities-4-People Toolkit of COS Methodology and Metrics**

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**Project overview:**

Cities-4-People unfolds in five European areas: the Oxfordshire County, Hamburg District of Altona, Üsküdar in Istanbul, Budapest and Trikala. In these areas Mobility Communities are set up involving citizens, city authorities, mobility providers and innovation experts. By developing and providing a framework of support services and tools, Cities-4-People empowers these communities to actively contribute to shaping their local mobility innovation ecosystems in line with a People-Oriented Transport and Mobility (POTM) approach. POTM encompasses a blend of new digital and social technologies under an inclusive and multidisciplinary approach in order to bring out solutions that have a low ecological footprint, a sharing mentality and the potential to solve real urban and peri-urban mobility issues.

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### Abbreviations

C4P	Cities-4-People
COS	Core-Outcome-Set
POTM	People-Orientated Transport Mobility

## Executive summary

This report (Deliverable 5.2) describes the co-creation of an open process for developing a Core-Outcome-Set (hereafter COS) of indicators for Cities-4-People project (hereafter: C4P). A novel feature of the process is that we sought to find out what mattered to people in the context of their lived experience of transport and mobility options in their cities. This is fundamental for people-oriented transport and mobility (POTM) which is at the centre of the C4P project's approach.

The COS was used to develop a survey (hereinafter: COS survey) that could be used to evaluate impacts of the C4P mobility solution (interventions) in the pilot phase, and the scale-up phase of the C4P project. This report builds on D5.1, which describes the first step in documenting the open process of co-developing the COS. **D5.2** therefore completes the description of the methodology and metrics for POTM.

WP5 and indeed D5.1 and 5.2, evolved in parallel to the development and piloting/ scaling- up phases of the pilots across the 5 Cities (Oxford, Hamburg, Budapest, Istanbul, Trikala), drawing on the community structures and work streams across the C4P consortium. Therefore, activities to co-create the COS took place before the pilots' deployment phase, and worked towards establishing a common baseline of measurements for assessing the take-up and impact of innovative mobility approaches, applied through our testbeds. In particular, we aimed to co-create a set of outcome measures and recommendations of what should be measured and reported.

This report is set out in the following way:

- Section 1 describes key features of the COS, the rationale for using the Delphi approach to develop the COS, and describes the Delphi methodology, and how it was deployed.
- Section 2 provides details of the Delphi process, and the analysis of both rounds.
- Section 3 describes how the findings from the Delphi process were used to develop a set of indicators and related questions for the COS survey.
- Section 4 summarises the strengths and limitations of the Delphi process used to develop the COS.

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## 1. Developing a Core-Outcome-Set

### 1.1 Recap of the Core-Outcome-Set Methodology

#### 1.1.1 What is the Core-Outcome-Set?

Fundamental to the C4P project, and what distinguishes it from previous transport and mobility interventions projects, is the concept of a **people-centric approach**. One of the main objectives of this approach is to establish a common baseline of outcomes, known as a Core-Outcome-Set (hereafter COS), through a participatory process of co-definition and co-creation. The COS comprises:

- **An agreed minimum set of measures of how to evaluate the impact of transport and mobility based on what people value in their daily lives.**

The COS enables recommendations of what should be measured and reported across the different city pilots.

We will use this common baseline throughout our evaluations. Therefore, in addition to the traditional transport and mobility evaluation indicators, the development of an evaluation set of outcome measures (COS) will also be informed by what matters to people in this way. The main goal of the process is to capture outcomes that matter to people, their families and their communities. As discussed in **D5.1**, the COS outcomes are designed to be:

- **Transferable to other cities: Adaptable to different geo-cultural contexts and intervention scales**
- **Transparent**
- **Used as a people led evidence base to be adopted by decision makers.**

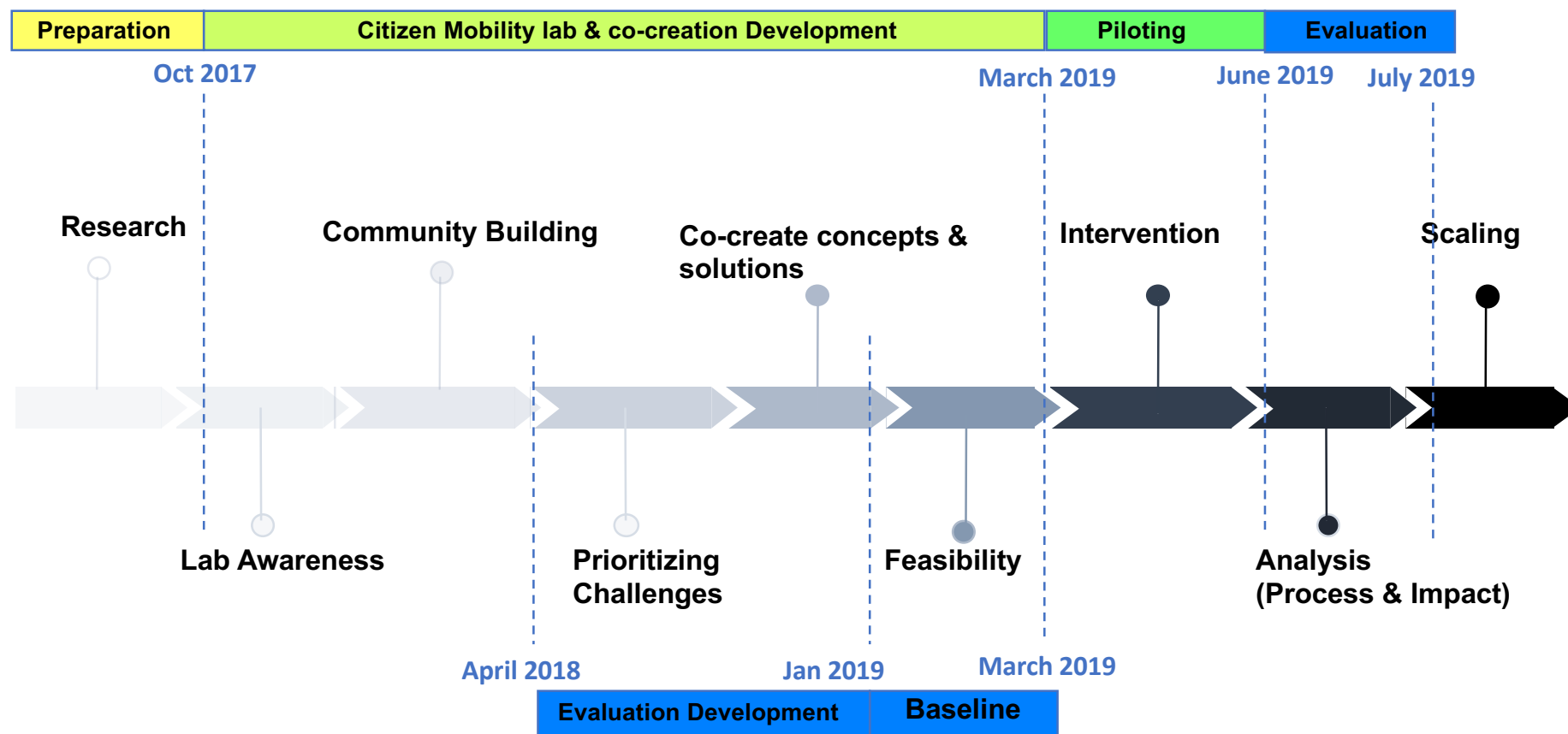
In order to develop the COS (as detailed in **D5.1**), a participatory methodological approach known as the Delphi Method was adopted. The Delphi Method was chosen for several reasons, which can be summed up as below:

- **Suitability for multifaceted problems or where there is a lack of a well-defined knowledge base**
- **Participants are able to suggest potential outcomes that they feel should be considered without being prompted or guided by others.**

It was also felt that such an approach would complement the ongoing co-creation activities within Citizen Mobility Labs.

#### 1.1.2 COS and C4P Project Timeline

The diagram shown in **figure 1** shows how the COS development process fits into the overall co-creation activity timeline of the C4P Project. The findings derived using this method will provide the basis of our outcome measures – the COS – used to evaluate the interventions across all five of the cities in C4P.

*Figure 1. Timeline of COS development in relation to the wider activities in Project*

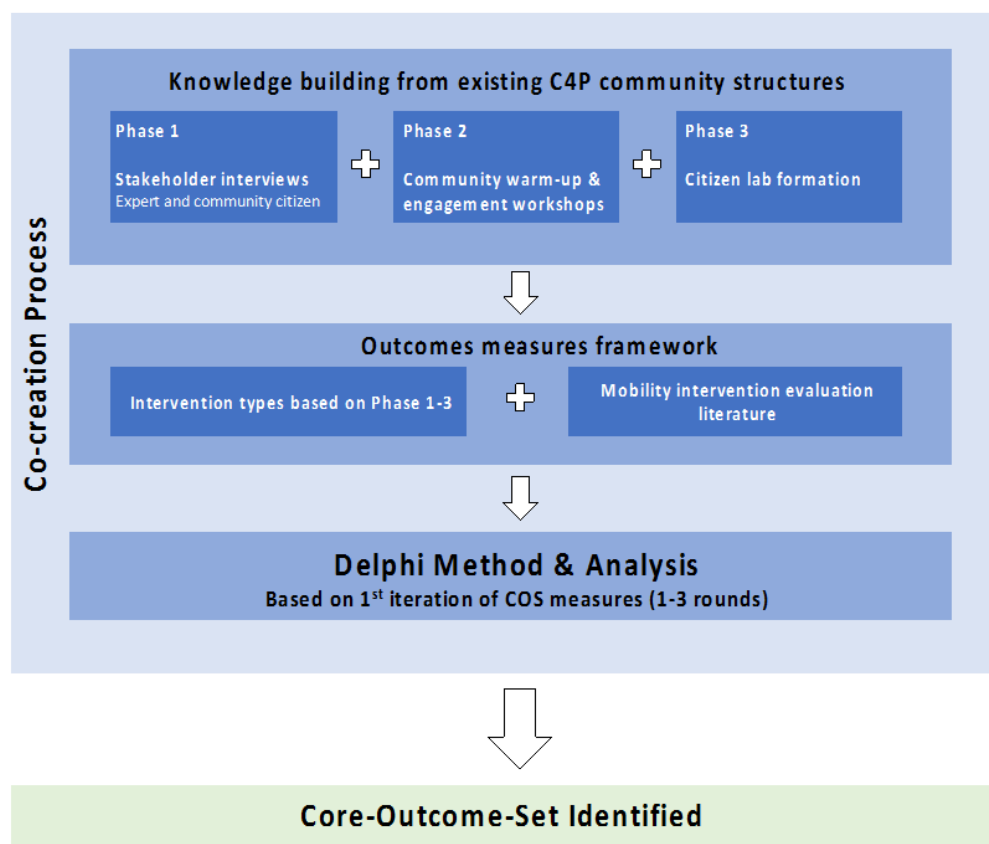
## 1.2 What is a Delphi Methodology?

The Delphi Method seeks to obtain consensus of opinions, through a series of *anonymous* structured questionnaires. Participants are invited to participate as a Delphi panel member and answer questionnaires independently of each other over two separate and sequential rounds. The opinions and information provided in the first-round questionnaire is then used to develop the second-round questionnaire.

As part of the process, anonymous responses are aggregated and shared with the all participants after each round. Throughout the process, Delphi participants have the opportunity to respond to the summarized data of the collective Delphi panel. The purpose of gathering participant's opinions in this way is intended to harness and organize judgement through a process of controlled feedback. The Delphi is therefore an iterative multi-stage process designed to combine opinion into group consensus.

### 1.2.1 The Role of Delphi Participants

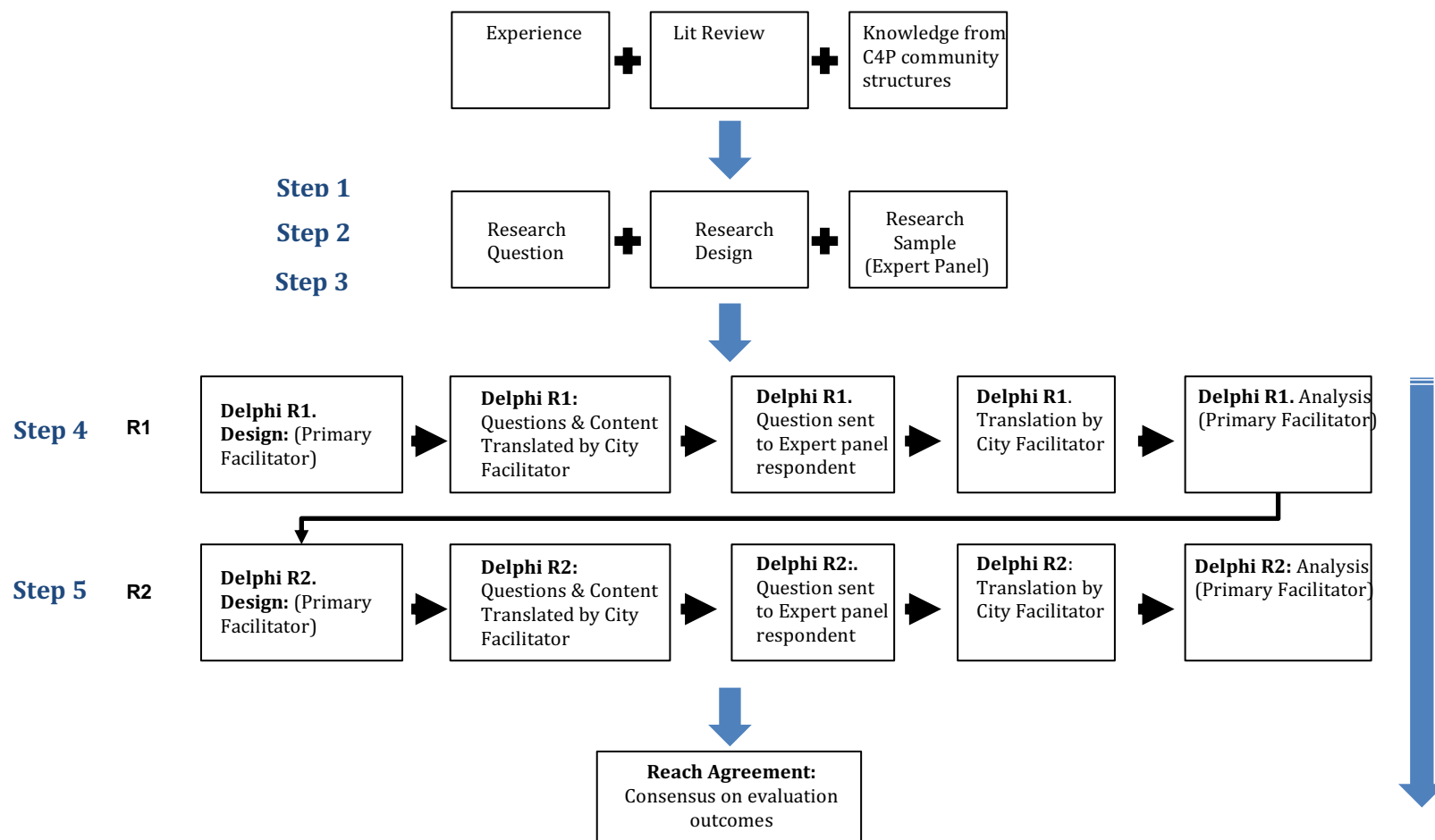
The role of Delphi participants was to co-develop a set of evaluation indicators based on the impacts they consider important in their daily lives, and applied to a broad range of mobility strategies. Participants were informed that their participation in the research project was voluntary.



*Figure 2. Diagram showing COS development proces*

### 1.3 Overall Delphi Process

Figure 3. Diagram showing Delphi Process



As shown in **figure 3**, there were a number of steps that need to be followed before the first Delphi Round could begin:

### **Step 1. Defining the problem:**

Prior to the panel of Delphi experts beginning the process of consensus building, it was essential to establish (as precisely as possible) the problem/issue they are being asked to comment on. Therefore, the opening question(s) in round-one needed to be carefully crafted in order to explore which impacts of a range of potential mobility strategies are important to people. The key question to explore is: which impact indicators in relation to mobility strategies, matter to people?

It is important to note that at this stage of the C4P project the mobility solutions were just beginning the co-creation phase, so the pilot interventions were not yet known.

### **Step 2. Identification of Delphi Panel Experts**

The Delphi Method is based on the principle that a structured group of experts are more likely to reach an accurate decision than an unstructured group of experts. Unlike survey studies where the goal is to generalize results to a larger population, the goal of Delphi is to reach consensus among a group of experts, where the emphasis is on group dynamics rather than statistical power. From the literature on studies that have utilized the Delphi Method there was a Recommendation of a minimum **10** and maximum, **50** participants.

Our Delphi panel was comprised of experts from across all 5 C4P cities and can be divided into two categories: Community of Users (hereafter CU), consisting of neighbourhood residents, and Community of Mobility Experts (hereafter CE). **20** participants were invited in; 2 CUs and 2 CEs from each city. Each city was responsible for identifying participants from their own **Citizen Mobility Lab**. Suitability criteria focused on potential participants who would derive a broad and diverse set of opinions. Another factor was time and availability as the process would need to be completed over a period of 10-12 weeks.

### **Step 3 Choose a Delphi facilitator**

Before **Step 4**, round-one of the Delphi Method could begin we needed to establish a structure and process for information to be exchanged and analysed between the main Delphi facilitator and participants. The main Delphi Facilitator is typically a researcher or person who is deemed *neutral* and familiar with research and data collection.

In this study the main facilitator was UCL as the lead partner and then one local facilitator from each city who acted as the central point of contact between the Delphi participants and UCL.

## 2. Delphi Process Results

### 2.1 Delphi Round-One

#### 2.1.1 Delphi Round-One Overview

##### Step 4: Round One of questionnaire

Once participants had been identified by the local facilitators, an email was sent out individually to formally invite them to participate in the study.

After participants had accepted the invitation, a second email was then sent which included the Delphi Study documents; including the relevant, **information sheet & consent form** and **instruction sheet** (CE or CU) and **first-round Delphi questionnaire** for Round 1 as word documents.

In this first-round questionnaire, the goal was to gain respondents' views on the **impacts they deemed important** if one of the transport and mobility intervention strategies (as shown below) was implemented their area.

The strategy types are:

1. **Promotion of action travel**
2. **Traffic reduction strategies**
3. **Affordable and quality travel options**
4. **Inclusive mobility infrastructure**
5. **Travel information provision and literacy**
6. **Emission & noise control strategies**
7. **Speed control strategies**

As discussed in more detail in the **D5.1** report, these seven strategies came out of the co-creation activities from each C4P cities' citizen mobility lab.

In the questionnaire, to be completed by each of the Delphi participants, each strategy type had its own table, with an example of commonly associated types of intervention that may come under that strategy type, an example of which can be seen in **figure 4**. These examples were not meant as a complete list and participants were not expected to respond to each example given, rather they should be thought of as a guide to each strategy type.

*Figure 4. An example of one of the seven tables used in the R1 Delphi*

Strategy type	How would this Strategy have an impact on daily life for:		
	You as an Individual	Your Family/Household	Your Neighbourhood
<b>1. Promotion of active travel</b>  <b>Examples of subcategory of interventions for guidance purposes only:</b> Pedestrian infrastructure (condition and provision) Cycling infrastructure (condition and provision) Bike parking Bike pooling systems Incentives Car free zones Green/recreational space Local action/campaigns (including community participation)	Type Here	Type Here	Type Here

As per the table shown in **figure 4**, the participants were asked to provide statements under the sub-headings; **‘You as an individual’**, **‘Your Family/Household’** and **‘Your Neighbourhood’**, for how the strategy type stated in the table has an impact on daily life. These subheadings were intended to gain views on the impacts that the participants think are important from a range of perspectives:

1. **‘You as an individual,’** their own personal circumstances.
2. **‘Your Family/Household,’** different transport and mobility needs of members of their family, who they live with or in the neighbourhood and write about how the strategy might impact on their daily lives.
3. **‘Your Neighbourhood’** the transport and mobility needs of people living in their neighbourhood (for example, older people, children, people with reduced mobility) and write here about how the strategy might impact them.

Additionally, under the **“Your Neighbourhood”** subheading, participants were also advised to consider people who spend time in the neighborhood for work/shopping/leisure or other purposes. In the **Appendix** section 1 of this report the full R1 questionnaire, showing all seven strategy tables, can be seen.



In C4P we have 5 different countries and hence 5 different languages; English, Hungarian, German, Turkish, and Greek. The questionnaire content (and materials; i.e., instructions) were first developed in English before sending on to the local city facilitator for official translation. Due to the tightness of the project time-lines, as shown in **figure 1** – deadline for collecting a pre-pilot baseline – the main constraint of this Delphi study was time, and specifically time between rounds to allow for translation. For this reason, participants were informed by their local facilitator that they had ten days from the receipt of questionnaire materials, to fill out and send back (preferably via email and in word format). To minimize participant drop-off between rounds, participants were also informed that they would receive a second questionnaire within a few weeks.

Once the questionnaire and consent form had been completed and sent back to the local facilitator, questionnaires were translated into English and sent to UCL for analysis.

### **2.1.2 Delphi Round-One Results & Analysis**

Once all responses had been collected by the main facilitator, responses were collated into one database and transferred to a suitable format (csv) ready for analysis.

The aim of the analysis in this first-round was to capture and classify any common viewpoints in relation to the seven strategies and their impact on daily life (from the three perspectives). In order to carry out this process effectively, responses for all the strategies and from all 5 cities – 140 in total – were collated and imported into a qualitative data analysis software package – Nvivo. Nvivo was chosen for suitability for qualitative research and text-based information

After an initial examination of the responses it was clear that coding based on key words alone, such as frequency, was not suitable. For example, while a respondent's text may include several key words/phrases, the meaning or intention of the text passage was on something else. Using Nvivo, we adopted a reflexive approach to code response data to find common themes and sub-themes. A reflexive approach was preferred as once researchers became familiar with responses, codes could be adapted and split into two or more codes, unlike fixed coding approaches. As there were two researchers involved in the coding process, this reflexive approach also allowed for theme development to occur towards the end of the process; where themes were created to capture a shared meaning around a central concept (i.e. safety).

The following themes were identified, as shown in the tables below:

**Table 1. Themes and Sub-Themes identified from Delphi Round 1 Responses**

Theme	Subthemes
<b>Built Environment Experience</b>	Social solidarity-enhancing (family & community); Liveability of public space; Physical Activity Outdoors; Psychological health & well being
<b>Travel Experience</b>	Stress; Convenience; Comfort; Choice of modes
<b>Individual Agency</b>	Independence; confidence; Choice (access to services)
<b>Safety:</b>	Physiological impacts on health a) Condition of pedestrian cycle Infrastructure b) Other road users (when walking cycling); Personal safety (crime);
<b>Financial impacts</b>	Travel costs; Impact on household expenditure

It should be noted that some responses included comments that were not mutually exclusive to one theme and there was some overlap. Also, there were some unforeseen responses that related to the negative aspects of the **7 strategies**; not everyone shared a pro-sustainable agenda, and some displayed anti-sustainable sentiment. In addition, some responses highlighted the potential dangers of alienating vulnerable citizens and exacerbating existing transport barriers.

### 2.1.3 Delphi Round One Summary

From the themes and subthemes, as shown in **Table 1** using the language and style of comments (phraseology of participants) from the responses in round one, we identified **23 aspects** that Delphi experts identified as important in relation to transport and mobility strategies and interventions.

These aspects are shown in **Table 1** under their corresponding theme and are the basis of the second-round of the Delphi Process.

**Table 2. 23 Aspects with corresponding theme and code**

Theme	Aspect	Code
<b>Safety</b>	Security of personal belongings (Bike, Car)	<b>1</b>
	Physical safety concerns due to road traffic	<b>2</b>
	Physical safety concerns due to poor condition of cycling/pedestrian infrastructure	<b>3</b>
<b>Built Environment Experience</b>	Improving the conditions of public spaces to encourage more social interaction	<b>4</b>
	Sleep deprivation due to noise pollution (traffic)	<b>5</b>
	Reclaim spaces (e.g. from vehicle parking) for informal outdoor activities	<b>6</b>
	Enjoyment of quiet and peaceful environment	<b>7</b>
	Enjoyment of an attractive environment	<b>8</b>
<b>Travel Experience</b>	Comfortable journey	<b>9</b>
	Ease of travel	<b>10</b>
	Anxiety and stress related to mobility (including reliability of transport service)	<b>11</b>
	Convenience of travel to carry-out daily tasks (relative to situation and time of day)	<b>12</b>
	Less time spent travelling allowing for more free time	<b>13</b>
	More choice of transport and mobility options	<b>16</b>
	More opportunity for physical activity (walking and/or cycling)	<b>23</b>
	Enjoyment and pleasure in the activity of transport (vehicular or non-vehicular)	<b>22</b>
	Cleanliness of public travel options	<b>20</b>
<b>Individual Agency</b>	More choice of destination options (supermarkets, GP)	<b>15</b>
	Ability to carry out daily journeys independently	<b>17</b>
	To be kept informed on transport and mobility options	<b>18</b>
	To participate in the process of decision making for transport and mobility	<b>19</b>
	Fair and equal chance for all citizens to participate in society	<b>21</b>
<b>Financial impacts</b>	Reduction in household expenditure on travel (affordable transport options)	<b>14</b>

The number in the code column of Table 2 is the code used in the charts in Section 2.2

## 2.2 Delphi Round Two

### 2.2.1 Delphi Round Two Overview

#### Step 5: Round two of questionnaire

The questions for the second round of Delphi method are aimed at gaining consensus on the common viewpoints/aspects identified by participants in round one. Once consensus is reached, the aspects in round two will underpin the final COS to evaluate the intervention phases of the C4P project.

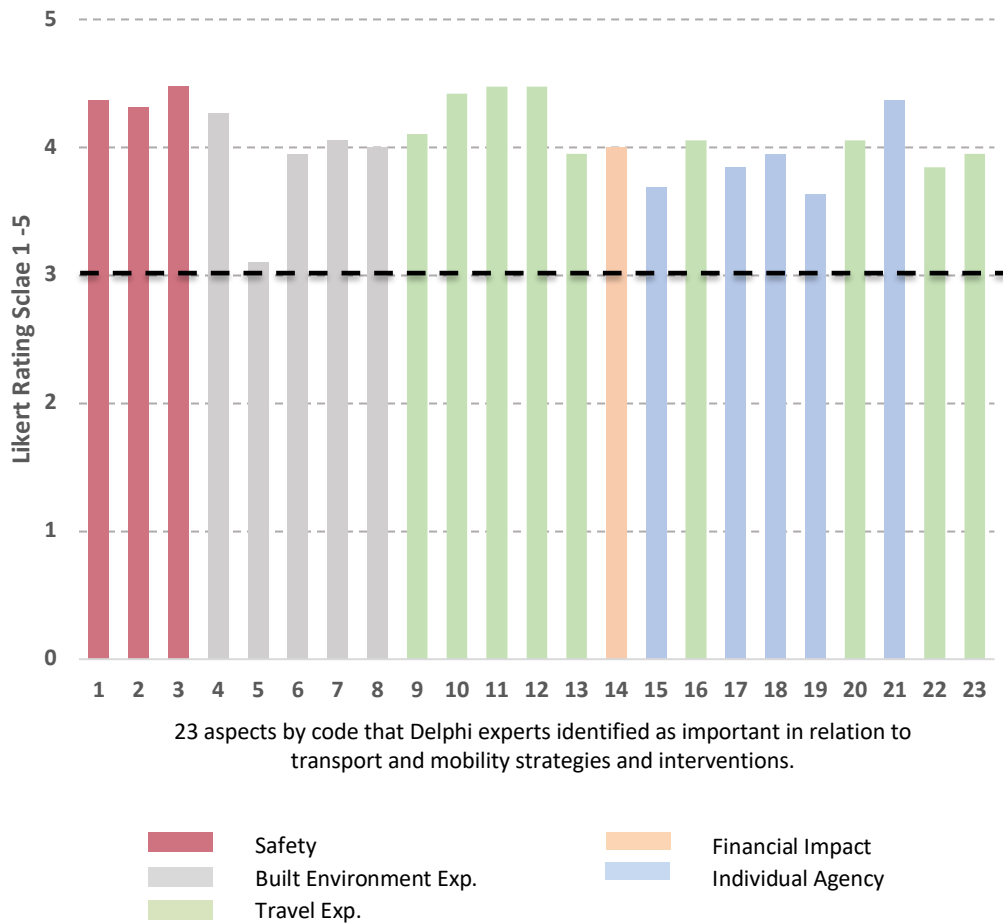
In round two, participants were asked to rate the 23 aspects (as shown in the previous section) by level of importance; from the perspective of the neighbourhood and community in their city, on a rating scale of 1-5 (where 1 is 'not important' and 5 is 'very important'). In addition to these 23 aspects, at the end of the questionnaire, participants were also asked if they thought any aspect of daily life impacted by mobility and transport was missing from that list. Traditional Delphi methods are mainly designed to narrow down options through a process of consensus building. In C4P, we adapted this Delphi method to foster opportunities for additional inputs in order to be as inclusive as possible and not to exclude viewpoints.

Round two followed the same process as round one; questionnaires and instructions were sent to each city's local facilitator for translation before sending on to the Delphi panel. The questionnaire used in round two can be seen in the appendix section of this report (**Appendix 2**).

### 2.2.2 Delphi Round Two Results & Analysis

Between round-one and two, there was a minimal drop-off rate; only one member of the Delphi panel withdrew from the process (Oxfordshire). Therefore, the number of participants for the round-two questionnaire was 19 in total across all cities.

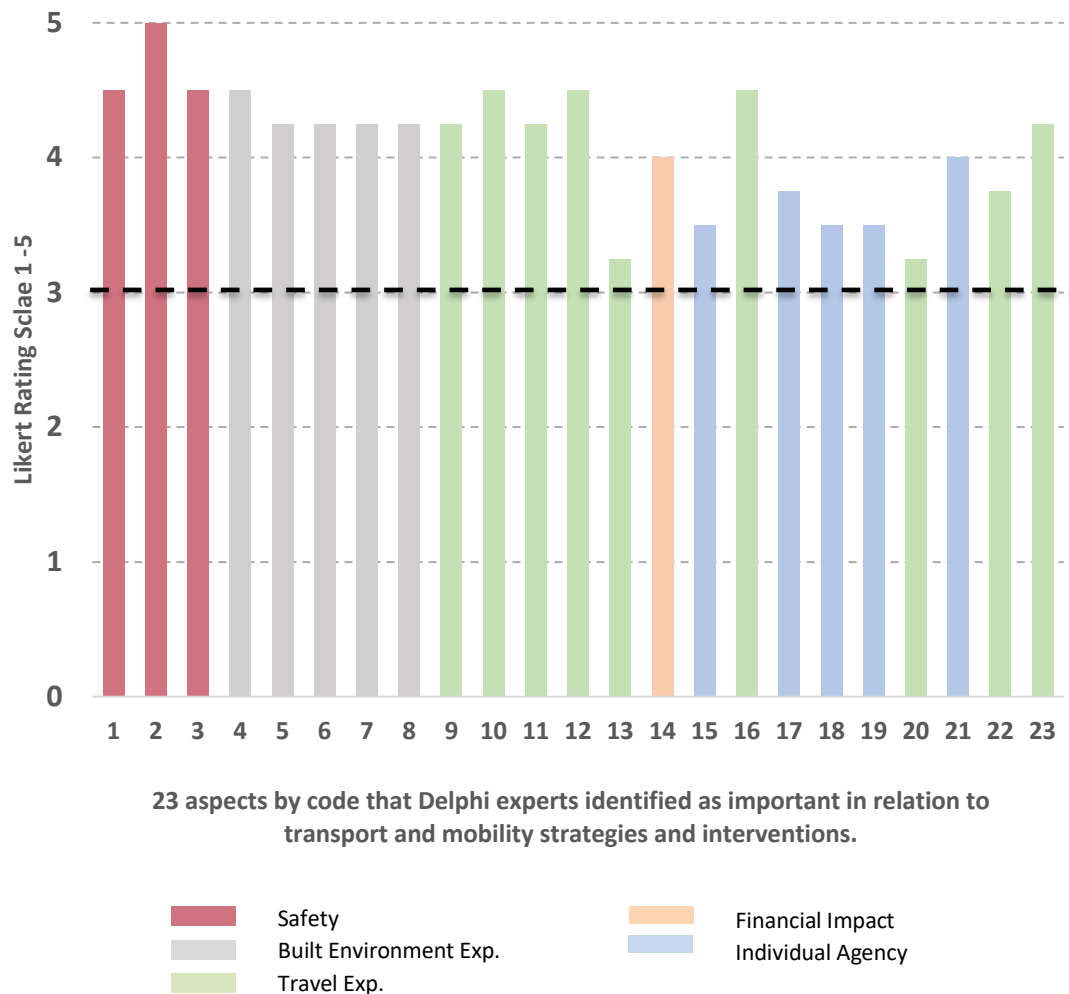
The following charts as shown in **figures 5 -10** show the means scores of how the expert panel rated the aspects in term of level of importance; firstly, collectively as whole panel and secondly by each city:

**Figure 5. Overall mean scores for level importance for the 23 aspects identified**

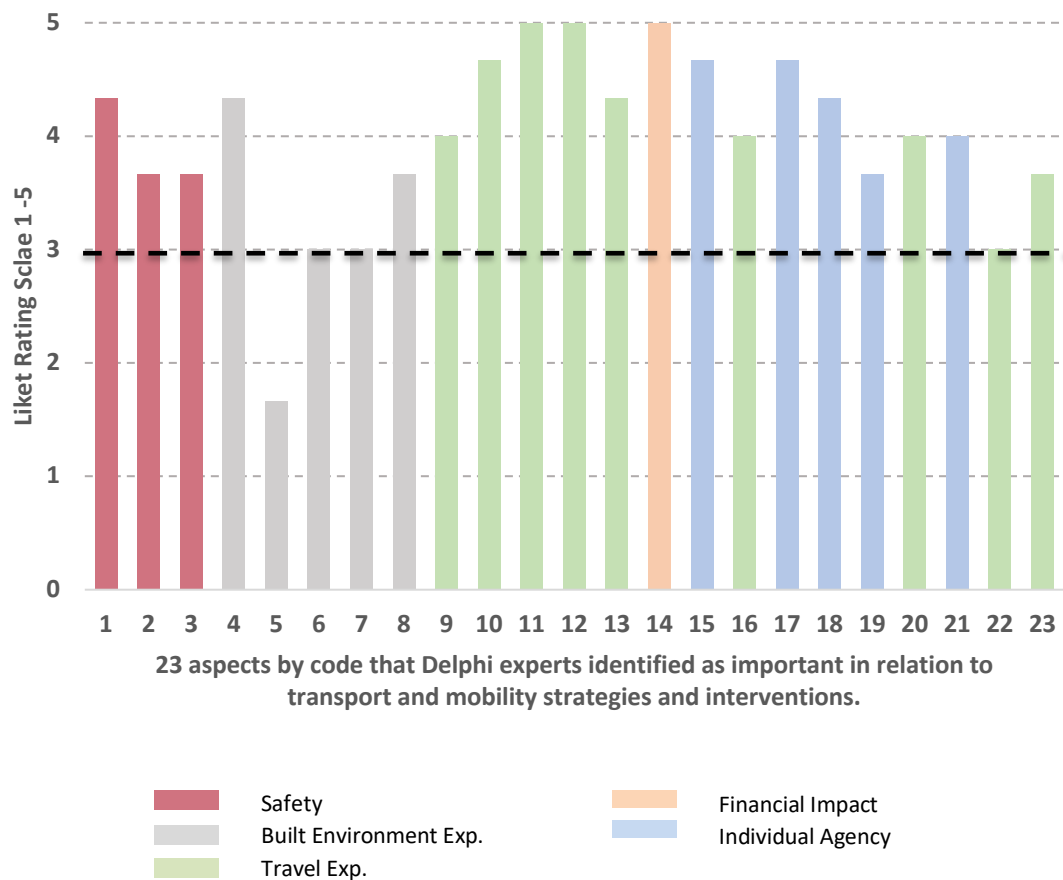
As can be seen in the chart above, which represents the views of the expert panel collectively across all cities, the 23 question and identified themes perform well in relation to their mean scores. Each of the identified aspects had a mean score higher than 3, and none of the identified aspects were deemed to be unimportant by the expert panel.

Aspects relating to safety scored highly across all cities. Among aspects relating to experience of the built environment, 'improving the conditions of public spaces to encourage more social interaction' was identified as most important. Among aspects of the travel experience, the three items deemed most important were 'ease of travel', 'anxiety and stress related to mobility and transport', and 'convenience of travel to carry out daily tasks'. Among aspects relating to 'individual agency', the highest importance was given to 'a fair and equal chance for all citizens to participate in society'. Affordable transport options scored 4 out of 5.

In order to understand any individual difference and see if there was any skew in results by a particular city, the following charts examine the same data but by city:

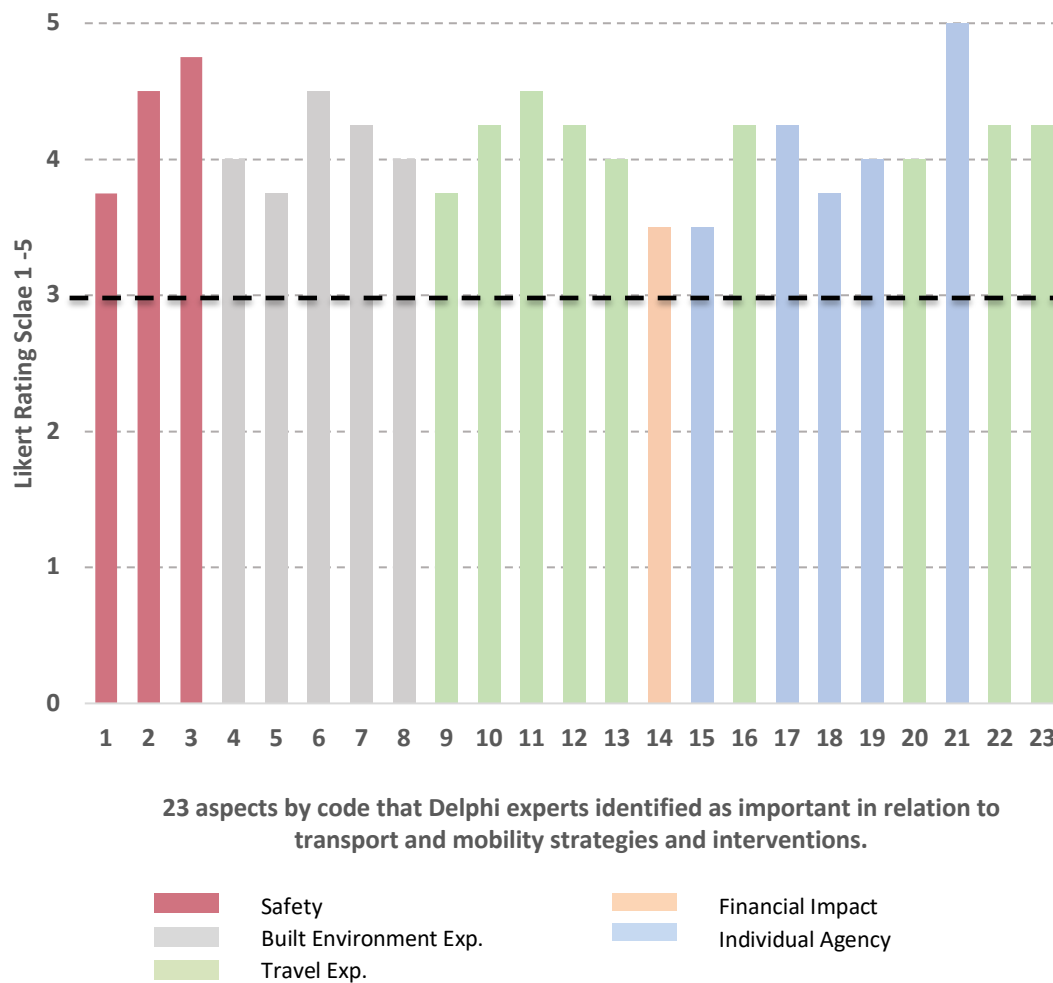
*Figure 6. Hamburg - Mean scores of level importance by city*

Considering the findings from the Delphi panel in Hamburg, all aspects received scores over 3. All aspects of safety scored over 4 out of 5 for importance, and 'physical safety concerns due to road traffic' scored the highest out of all aspects at 5/5. All aspects of experience of the built environment scored over 4, with 'improving the conditions of public spaces to encourage more social interaction' scoring the highest of these. Among aspects of the travel experience, 'ease of travel' and 'convenience of travel to carry out daily tasks' were deemed most important, and 'less time spent travelling allowing for more free time' was deemed to be of least importance. Among individual agency aspects, the highest score was for 'fair and equal chance for all citizens to participate in society'. Affordable transport options scored 4 out of 5.

*Figure 7. Oxford - Mean scores of level importance by city*

Considering the findings from the Delphi panel in Oxfordshire, sleep deprivation due to noise pollution from traffic was the only aspect that was not deemed to be important (score: 1.7). However, we retained the item for consistency. All the other aspects scored over 3.

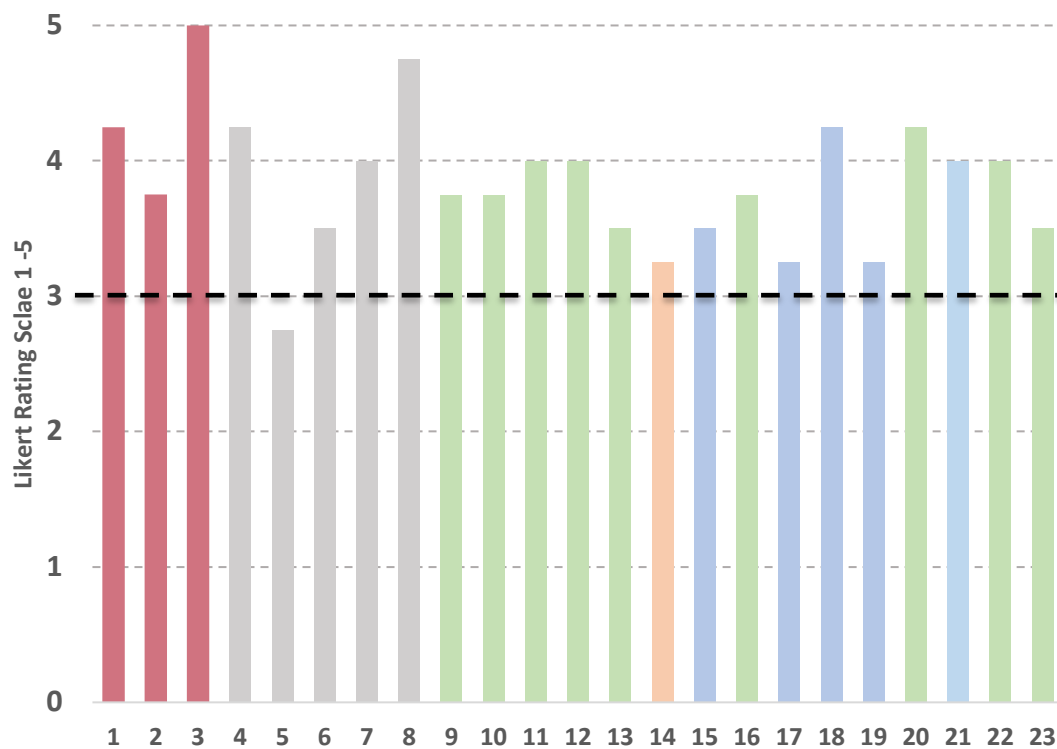
Three items scored 5/5, two of which relate to the travel experience ('anxiety and stress related to mobility' and 'convenience of travel to carry out daily tasks') and one relates to the financial impact (affordable travel options).

**Figure 8. Trikala - Mean scores of level importance by city**

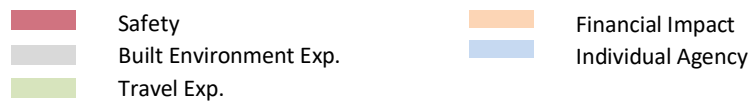
Considering the findings from the Delphi panel in Trikala, all aspects were considered important (scores over 3). The aspect considered most important was 'fair and equal chance for all citizens to participate in society', which scored 5/5.

**Figure 9. Budapest - Mean scores of level importance by city**



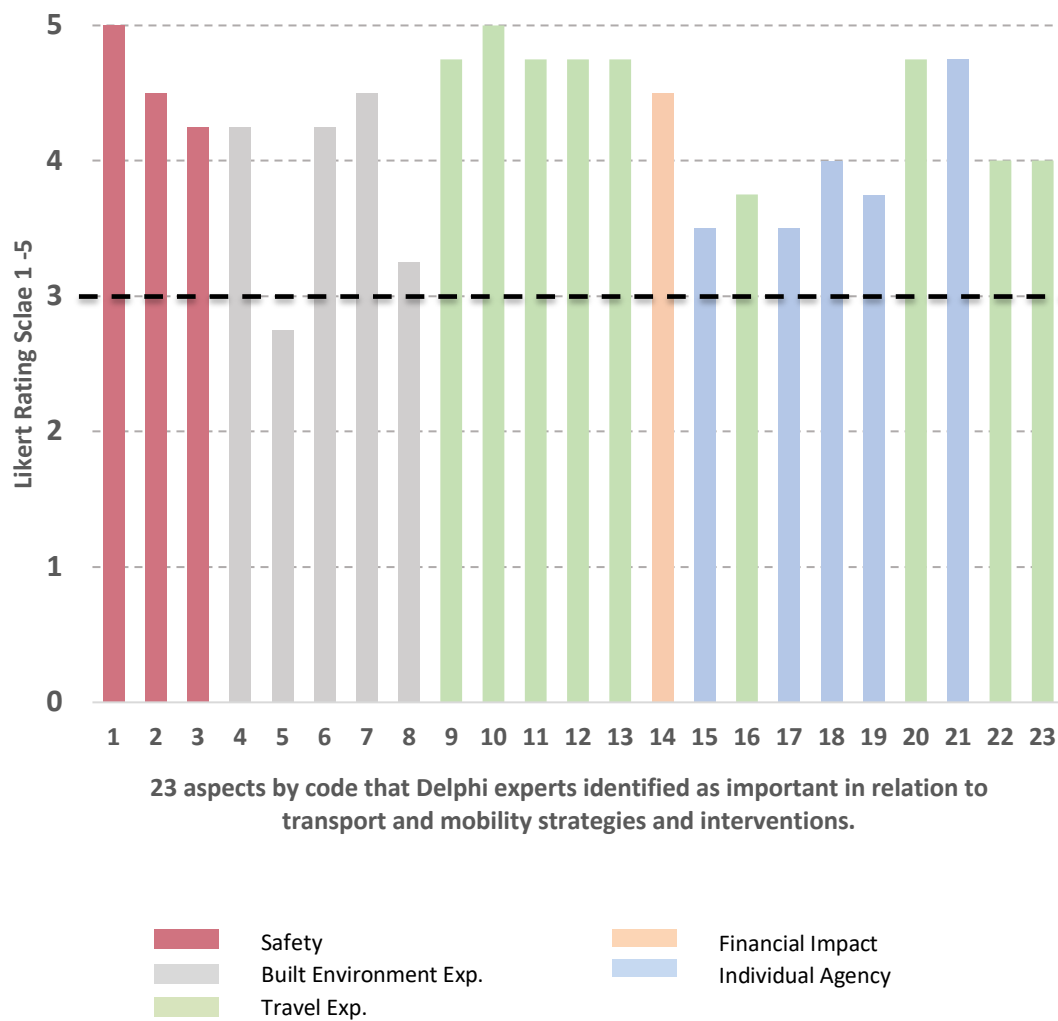


23 aspects by code that Delphi experts identified as important in relation to transport and mobility strategies and interventions.



Considering the findings from the Delphi panel in Budapest, sleep deprivation due to noise pollution from traffic was the only aspect that was not deemed to be important (2.75/5). All other aspects score over 3/5. The aspect deemed most important was 'physical safety concerns due to poor condition of cycling/pedestrian infrastructure' (5/5). The next in importance was 'enjoyment of an attractive environment' (4.75/5)

*Figure 10. Üsküdar - Mean scores of level importance by city*



Considering the findings from the Delphi panel in Üsküdar, sleep deprivation due to noise pollution from traffic was the only item that was not deemed to be important (2.75/5). Aspects considered to be the most important were ‘security of personal belongings’ and ‘ease of travel’ which both scored 5/5.

### 2.2.3 Delphi Round Two Summary

The previous section reported the level of importance that the Delphi panels in the five partners cities ascribed to each of the identified aspects. As might be expected there are some differences across cities, but also some similarities.

In three cities, Budapest, Üsküdar, and Oxford, sleep deprivation due to noise pollution from traffic was deemed least important, scoring less than 3/5.

All other aspects were considered important, to a lesser or greater extent, by Delphi panels in all 5 cities.

### 3. COS Indicators

#### 3.1 From Delphi Results to COS Indicators

Following on from the Delphi Round Two analysis, the final part of the process was to select the corresponding questions that will feature in the final COS survey. This Delphi and COS development process was severely constrained by the project timeline; on-going C4P activities and the main requirement of having a finalized COS – with ethical approval – translated and ready to take a baseline in each city before the piloting phase could begin. To that end, there was only a short time period to craft our own corresponding questions and validate them. Therefore, as a project team we decided to seek out established and recognize validated questions.

The following sources (as seen in **tables 3-7**) were used to match and select questions to the 23 aspects, as detailed in the previous section. The search criteria for the sources of validated questions ranged from national and regional surveys on transport to academic led surveys in peer reviewed journals.

**Table 3. Safety- Aspects matched with validated questions (with source)**

Code	Aspect	Validated Question(adapted)	Source	Note
1.	Security of personal belongings (Bike, Car)	Overall, when travelling by public transport I feel safe from crime or threatening behaviour.	NatCen Omnibus: Anti-social behaviour and crime on public transport	

2	Physical safety concerns due to road traffic	In relation to road traffic, I feel safe when using roads and pedestrian walkways.	ONS Omnibus: Built Environment	
3	Physical safety concerns due to poor condition of cycling/pedestrian infrastructure	To what extent do you agree that the following factors prevent you from using active travel (e.g. walking, cycling, scooting) in your daily journey(s)?	School Travel Survey for Parents Sustrans and Scottish Parent Teacher Council July 2017	Adapted from school survey to general barriers to active travel **

**\*\*Note:** Question absorbed as part of section on barriers to active travel in final COS, as seen in Appendix 3; which includes sub-questions 22-32.

**Table 4. Built Environment Experience - Aspects matched with validated questions (with source)**

Code	Aspect	Validated Question(adapted)	Source	Note
4	Improving the conditions of public spaces to encourage more social interaction	To what extent do you think the public and open space in (City*) encourage social interaction with other people	Relatable validated question could not be sourced	Question was crafted and tested within the Project team
5	Sleep deprivation due to noise pollution (traffic)	Overall, how often is your sleep disturbed by traffic noise?	Attitudes to Noise from Aviation Sources in England (ANASE)	Adapted to suit vehicular noise
6	Reclaim spaces (e.g. from vehicle parking) for informal outdoor activities	How easy is it for you to carry out recreational outdoor activity in public spaces in City*?	Relatable validated question could not be sourced	Question was crafted and tested within the Project team
7	Enjoyment of quiet and peaceful environment	In city the outdoor public spaces are peaceful and enjoyable.	Relatable validated question could not be sourced	Question was crafted and tested within the Project team

8	Enjoyment of an attractive environment	Thinking now about the quality of the streets or roads in <b>city*</b> , how would you rate your experience of this environment?	ONS Omnibus: Built Environment	
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**Table 5. Travel Experience - Aspects matched with validated questions (with source)**

Code	Aspect	Validated Question(adapted)	Source	Note
9	Comfortable journey	How satisfied are you with the level of comfort on your regular journeys?	Aberdeenshire and Aberdeen City Bus Passenger Satisfaction Surveys 2015	Adapted to transport in general from only bus
10	Ease of travel	How satisfied are you with the ease of travel on your regular journey?	Aberdeenshire and Aberdeen City Bus Passenger Satisfaction Surveys 2015	Adapted to public transport in general from only bus
11	Anxiety and stress related to mobility (including reliability of transport service)	To what extent do you agree with the following statement: I feel stress during my regular journeys	<a href="#">Transportation Research Part F: Traffic Psychology and Behaviour.</a>	
12	Convenience of travel to carry-out daily tasks (relative to situation and time of day)	How convenient are the public transportation options available to you for carrying out day-to-day tasks?	Relatable validated question could not be sourced	Question was crafted and tested within the Project team
13	Less time spent travelling allowing for more free time	To what extent do you agree with the following statement: The amount of time I spend travelling takes away time from my personal free time?	Relatable validated question could not be sourced	Question was crafted and tested within the Project team

16	More choice of transport and mobility options	How satisfied are you with your regular transport services?	National Travel Survey, 2002-2016	Source used as a ref only to craft a modified question
20	Cleanliness of public travel options	I am satisfied with the cleanliness of public transport services in <b>City</b>	Aberdeenshire and Aberdeen City Bus Passenger Satisfaction Surveys 2015	Adapted to public transport in general from only bus
22	Enjoyment and pleasure in the activity of transport (vehicular or non-vehicular)	Overall, I enjoy my regular journeys.	Relatable validated question could not be sourced	Question was crafted and tested within the Project team
23	More opportunity for physical activity (walking and/or cycling)	To what extent do you agree that any of the following factors prevent you from using active travel (e.g. walking, cycling, in your daily journey(s)?  (see <b>Appendix 3 for barrier options</b> )	School Travel Survey for Parents Sustrans and Scottish Parent Teacher Council July 2017	Adapted to active travel & extended to cover range of barriers: Q22-32 see <b>Appendix 3</b>

**Table 6. Individual Agency - Aspects matched with validated questions (with source)**

Code	Aspect	Validated Question(adapted)	Source	Note
15	More choice of destination options (supermarkets, GP)	How easy is it for you to get to the places that you regularly go to satisfy your daily needs? (e.g. supermarkets, GP)	General Lifestyle Survey (GLS); Household Section	Source used as a ref only to craft a modified question
17	Ability to carry out daily journeys independently	The public transport services in <b>City</b> * support passengers who may require additional assistance to carry out their daily journeys independently.	Relatable validated question could not be sourced	Question was crafted a tested within the Project team

18	To be kept informed on transport and mobility options	How easy is it for you to find information on the transport routes and times available when planning your journey?	Aberdeenshire and Aberdeen City Bus Passenger Satisfaction Surveys 2015	Source used as a ref only to craft a modified question
19	To participate in the process of decision making for transport and mobility	I am able to participate in the process of local transport and mobility decision making in City*.	Relatable validated question could not be sourced	Question was crafted a tested within the Project team
21	Fair and equal chance for all citizens to participate in society	Transport and mobility options in City* give all citizens a fair and equal chance to participate in society.	Relatable validated question could not be sourced	Question was crafted and tested within the Project team

**Table 7. Financial impacts- Aspects matched with validated questions (with source)**

Code	Aspect	Validated Question(adapted)	Source	Note
14	Reduction in household expenditure on travel (affordable transport options)	How affordable do you find the transport options in City*?	Relatable validated question could not be sourced	Question was crafted a tested within the Project team

As seen in **tables 3-7**, for 10/23 aspects, matching related validated questions could not be sourced. For those 10 aspects, new questions were carefully crafted and then tested internally within the project consortium. It should be noted, where a validated question was not found, this does not mean that it did not exist, but rather that we did not find a relevant validated question at the time of the COS development process within the limited time available in the project timeline.

Once the consortium had agreed on the final questions for COS, the final 32 questions (as seen in **Appendix 3**) were sent to each city for translation.

## 4. Summary of Delphi process to Develop COS

This report has described the use of the Delphi process to develop the COS for transport and mobility, and the method used to derive a set of measures to create a questionnaire (the COS survey) to be used to evaluate C4P pilot interventions and scale up interventions in 5 cities.

As with all methodologies, there are strengths and limitations in the Delphi methodology we developed.

The anonymity of the Delphi process is a strength because it enables people to give their opinions freely. It counters the possibility that one or two people might dominate group discussions and sway group decisions, which is inherent to group decisions made during face-to-face meetings. In addition, the Delphi process helps in understanding uncertainty, in this case, understanding what aspects of transport and mobility matter to people in their daily lives. This might be expected to be highly variable in different contexts, but in fact we found many similarities across cities, as well as some differences.

A further and important strength of the Delphi methodology is that the final output represents the views of representatives of different groups, because it has been co-created with them. In the case of C4P, the COS has been co-created by community of experts in transport and mobility, as well as by users of transport and mobility. This helps to create political and public buy-in on measures to evaluate transport and mobility in cities. Finally, the method offers versatility across different geographical, cultural and political contexts by emphasizing what matters to people.

The main limitation of using the Delphi approach is that it takes time to complete the process. In our study across five cities in five countries, extra time was needed for translation of the questions and responses before analysis and between iteration rounds of the process. This was a major challenge considering the short timeframe of the C4P project. In addition, it is possible that translation might introduce nuances of meaning in different country contexts.

Overall, the Delphi process is a useful tool in finding out which aspects of transport and mobility matter to people in their daily lives, across different city contexts.

The COS survey derived using this process was piloted in five cities within the C4P consortium. Implementation of the COS survey and the findings from this process are described in Report deliverable 5.5: 'Evaluation outcomes of the mobility solutions outcomes'.



## 5. Appendix

### 5.1 Appendix 1 – Delphi Round-One Questionnaire

Strategy type	How would this Strategy have an impact on daily life for:		
	You as an Individual	Your Family/Household	Your Neighbourhood
<b>1. Promotion of active travel</b>  <b>Examples of subcategory of interventions for guidance purposes only:</b> Pedestrian infrastructure (condition and provision) Cycling infrastructure (condition and provision) Bike parking Bike pooling systems Incentives Car free zones Green/recreational space Local action/campaigns (including community participation)			

Strategy type	How would this Strategy have an impact on daily life for:		
	You as an Individual	Your Family/Household	Your Neighbourhood
<b>2. Traffic reduction strategies</b>  <b>Examples of subcategory of interventions for guidance purposes only:</b> Congestion & carbon emission control Parking (Park & Ride)			

Strategy type	How would this Strategy have an impact on daily life for:		
	You as an Individual	Your Family/Household	Your Neighbourhood
<b>3. Affordable and quality travel options</b>  <b>Examples of subcategory of interventions for guidance purposes only:</b> Public service provision Taxi (smart) Parking (free or low-cost Park & Ride) Dynamic Travel options (DRT) Increased frequency of public transport			

Strategy type	How would this Strategy have an impact on daily life for:		
	You as an Individual	Your Family/Household	Your Neighbourhood
<b>4. Inclusive mobility infrastructure</b>  <b>Examples of subcategory of interventions for guidance purposes only:</b>  Accessibility related interventions e.g. ramps, priority seating  Safety related interventions  Placement of public transport stops  Redistribution of space			

Strategy type	How would this Strategy have an impact on daily life for:		
	You as an Individual	Your Family/Household	Your Neighbourhood
<b>5. Travel information provision and literacy</b>  <b>Examples of subcategory of interventions for guidance purposes only:</b> Real-time service information Multiple modes of delivery (including web/apps) Outreach workshops Signage			

Strategy type	How would this Strategy have an impact on daily life for:		
	You as an Individual	Your Family/Household	Your Neighbourhood
<b>6. Emission &amp; noise control strategies</b>  <b>Examples of subcategory of interventions for guidance purposes only:</b>  Low-emission zones  Incentivising electric cars (e.g. more charging points)			

Strategy type	How would this Strategy have an impact on daily life for:		
	You as an Individual	Your Family/Household	Your Neighbourhood
<b>7. Speed control strategies</b>  <b>Examples of subcategory of interventions for guidance purposes only:</b> Lower speed limits Stricter enforcement Traffic calming Public education			

## 5.2 Appendix 2 – Delphi Round- Two Questionnaire

From the perspective of the community in **[City/Area of interest]** how important are the following aspects of daily life in relation to mobility and transport? Please select a level of importance from 1 (not important) to 5 (very important).

	Not Important			Very Important	
1. Security of personal belongings (Bike, Car)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
2. Physical safety concerns due to road traffic	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
3. Physical safety concerns due to poor condition of cycling/pedestrian infrastructure	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
4. Improving the conditions of public spaces to encourage more social interaction	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
5. Sleep deprivation due to noise pollution (traffic)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
6. Reclaim spaces (e.g. from vehicle parking) for informal outdoor activities	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
7. Enjoyment of quiet and peaceful environment	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
8. Enjoyment of an attractive environment	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
9. Comfortable journey	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
10. Ease of travel	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
11. Anxiety and stress related to mobility (including reliability of transport service)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
12. Convenience of travel to carry-out daily tasks (relative to situation and time of day)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5



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**From the perspective of the community in Barton, Oxford how important are the following aspects of daily life in relation to mobility and transport?** Please select a level of importance from 1 (not important) to 5 (very important).

	Not Important			Very Important	
	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
13. Less time spent travelling allowing for more free time	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
14. Reduction in household expenditure on travel (affordable transport options)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
15. More choice of destination options (supermarkets, GP)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
16. More choice of transport and mobility options	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
17. Ability to carry out daily journeys independently	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
18. To be kept informed on transport and mobility options	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
19. To participate in the process of decision making for transport and mobility	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
20. Cleanliness of public travel options	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
21. Fair and equal chance for all citizens to participate in society	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
22. Enjoyment and pleasure in the activity of transport (vehicular or non-vehicular)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
23. More opportunity for physical activity (walking and/or cycling)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

If you wish to comment and/or think there is an aspect missing from the list above, then in the box provided (on the next page) please write what you think that is and why, as well as number on a scale of 1-5 (where 1 is 'not important' and 5 is 'very important'), of how important that aspect is.



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## 5.3 Appendix 3 – COS Questionnaire – Selected questions

### Part B: Your views on Transport & Mobility in city\*

To what extent do you agree with the following statements:

**1. Overall, when travelling by public transport I feel safe from crime or threatening behaviour.**

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

**2. In relation to road traffic, I feel safe when using roads and pedestrian walkways.**

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

**3. The public and open space in city encourages social interaction with other people.**

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree

**4. I am satisfied with the cleanliness of public transport services in city**

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

**5. In city the outdoor public spaces are peaceful and enjoyable.**

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

**6. I find my regular journeys in city stressful.**

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

**7. The duration of my regular journeys takes away precious time from my personal free time.**

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

**8. The public transport services in **city** support passengers who may require additional assistance to carry out their daily journeys independently.**

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

**9. I am able to participate in the process of local transport and mobility decision making in **city**.**

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

**10. Transport and mobility options in **city** give all citizens a fair and equal chance to participate in society.**

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

**11. Overall, I enjoy my regular journeys.**

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

**12. Overall, how often is your sleep disturbed by traffic noise?**

- ☐ Never
- ☐ Hardly ever
- ☐ Occasionally
- ☐ Fairly often
- ☐ Very often

**13. How easy is it for you to carry out recreational outdoor activity in public spaces in city?**

- ☐ Very Difficult
- ☐ Difficult
- ☐ Neither difficult or easy
- ☐ Easy
- ☐ Very Easy

**14. How easy is it for you to get to the places that you regularly go to satisfy your daily needs? (e.g. supermarkets, GP)**

- ☐ Very Difficult
- ☐ Difficult
- ☐ Neither difficult or easy
- ☐ Easy
- ☐ Very Easy

**15. How easy is it for you to find information on the transport routes and times available when planning your journey?**

- ☐ Very Difficult
- ☐ Difficult
- ☐ Neither difficult or easy
- ☐ Easy
- ☐ Very Easy

**16. Thinking now about the quality of the streets or roads in **city**, how would you rate your experience of this environment?**

- ☐ Very Satisfied
- ☐ Satisfied
- ☐ Neither satisfied or dissatisfied
- ☐ Dissatisfied
- ☐ Very Dissatisfied

**17. How satisfied are you with the level of comfort on your regular journeys?**

- ☐ Very Satisfied
- ☐ Satisfied
- ☐ Neither satisfied or dissatisfied
- ☐ Dissatisfied
- ☐ Very Dissatisfied

**18. How satisfied are you with the ease of travel on your regular journeys?**

- ☐ Very Satisfied
- ☐ Satisfied
- ☐ Neither satisfied or dissatisfied
- ☐ Dissatisfied
- ☐ Very Dissatisfied

**19. How satisfied are you with your regular public transport services?**

- ☐ Very Satisfied
- ☐ Satisfied
- ☐ Neither satisfied or dissatisfied
- ☐ Dissatisfied
- ☐ Very Dissatisfied

**20. How convenient are the public transportation options available to you for carrying out day-to-day tasks?**

- ☐ Very convenient
- ☐ Convenient
- ☐ Neither convenient or inconvenient
- ☐ Inconvenient
- ☐ Very inconvenient

**21. How affordable do you find the transport options in city?**

- ☐ Very affordable
- ☐ Affordable
- ☐ Neither affordable or unaffordable
- ☐ Unaffordable
- ☐ Very unaffordable

**To what extent do you agree that any of the following factors prevent you from using active travel (e.g. walking, cycling, in your daily journey(s)?**

**22. It isn't practical for my lifestyle (e.g. family or social reasons)**

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

**23. It isn't safe (e.g. due to traffic)**

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

**24. There is a lack of showers/changing facilities at my destination**

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

**25. It's too hilly**

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree



**26. It's too far to walk**

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

**27. The weather**

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

**28. Don't have enough time**

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

**29. Can't fit it into my work patterns**

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

**30. There aren't enough cycle routes that connect my destination to my home**

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

**31. Health Issues prevent me from walking and/or cycling much**

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

**32. Poor condition of walking and cycling infrastructure (e.g. pavements, cycle lanes)**

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

**33. Is there anything else you would like to say that has not been covered in the survey?**

*Please write in this box*