

Impact Study



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DELIVERABLES REPORT

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IMPACT STUDY

1. Introduction and objectives

This document outlines the main results of the research, monitoring and evaluation activities conducted within the 3Cs project to investigate the choices and behaviour of the communities of the four universities involved (Coimbra, Madrid - Camilo José Cela, Montpellier - Paul Valéry and Torino) concerning active mobility, both for home-to-university commuting as well as all other endeavours of daily life. The analyses presented are mainly based on two surveys conducted in different moments of the project timespan. The first (*Survey 1* from now on) was conducted independently from any other activity related to the project, in the summer of 2024; the second one (*Survey 2* in the following) was instead linked to the initiative conceived and promoted by 3Cs project with the support of MUV, a firm based in Palermo (Italy) that has developed a gamification mobile app that was adapted and used to conduct both a competition promoting the use of sustainable mobility among members of each single university (September 2024), as well as a challenge among the teams of the four universities (April 2025). While the first game considered all types of sustainable mobility, thus including public transport and all forms of micro mobility, the second restricted its scope to active mobility only, in line with the core purpose of the 3Cs project.

In fact, Survey 2 was conceived to delve in more depth into the practice of cycling and walking, as well as into the experiences of those who took part in the challenge between universities through MUV, and the possible changes in motivation and/or habits affected by the initiative.

The primary objective of Deliverable D2.2 is to investigate - beyond the objective assessment of the environment around university campuses in terms of the availability and quality of facilities for walking and cycling - whether the actual members of the community revolving around those campuses *feel* comfortable and safe using active mobility as the way to move around. The surveys go beyond this, getting information about active mobility also as the way to perform daily chores like shopping, performing small duties, as well as visiting friends and relatives, etc. In other words, the aim is to shed light on all aspects that can make active mobility a significant part of a global healthy lifestyle.

Finally, Survey 1 has an even larger scope as it records also the use of all other possible mobility modes, considering also the possible multimodality of the home-to-university commuting.

2. The data collection strategy

Both surveys were conducted online, using "Uniquet", the official Limesurvey 6.0 platform of the University of Turin. Survey 1 was split into four similar ones, each with two languages: one of the four local languages and English. Survey 2 was instead based on a single questionnaire, including all five languages involved.

Apart from languages difference, the Survey 1 questionnaire for Coimbra, Madrid and Montpellier were identical; the Torino questionnaire was instead part of a larger one, conceived for the preparation of the "Piano spostamenti casa-università" (*Plan for home-to-university commuting*) due in the same timespan. As submitting two different





questionnaires on closely related matters at the same time was reputed unfeasible, causing confusion among respondents and lowering the expected response rates, it was decided to build a combined single survey. Maximum care was put into checking that all data for the 3Cs survey were going to be available for Torino as well as the other partners, though requiring for that city some additional data management and recoding operations.

All partners agreed to share the full datasets that were going to be obtained from the surveys, in the spirit of full collaboration among the four universities. This however required to draw up a complex data management plan, detailing all aspects of data property and its subsequent processing, so as to respect all regulatory and privacy requirements for each of the four countries. The process took a fair amount of time to be perfected, and to obtain a final agreement that could be signed by all four rectors. Due to this, combined with the time required to edit the questionnaire contents, as well as specific technical and/or administrative constraints by each university, the survey was conducted later than expected, and not exactly in the same period of time in all locations. In fact, it went along from Spring to Autumn 2024, while the submission period for each city was around two months.

Having experienced such difficulties and delays with Survey 1, Survey 2 was planned in a more orderly manner, being conducted concurrently for all universities on the exact same questionnaire; however, as the latter was linked to the challenge played through the MUV app, it was more participated where the MUV app was vastly used, and less so in cases where MUV players were few.

3. The surveys response rates and sample composition in Survey 1

As participation to both the polls was fully voluntary, the collected samples do not allow for rigorous statistical and probabilistic procedures to be conducted; as well known, self-selected samples may be subject to risks of bias in the results. It was therefore imperative to obtain as large as possible samples, trying to offset such risks with the sheer number of responses.

To help achieve this, various prizes were offered to randomly selected participants to the survey in each university. Also, promotional campaigns to motivate participation were set up everywhere, using a variety of communication means, through the web (emails, banners and specific pages on the universities web pages, social media) and with direct personal contacts with potential respondents.

For Survey 1, the final response rates were as presented in Table 3.1. Since the questionnaire was divided into nine thematic sections, and it was possible to stop compiling it at will, not all responses were full. Still, some people did complete a certain number of sections that can offer information of some topic, albeit not the full set. The “Completed responses” are instead those where *all* sections were filled.

Table 3.1 - Responses and response rates - Survey 1

City	All responses		Completed responses	
	Frequency	%	Frequency	%
Coimbra	1241	5.9%	761	5.5%
Madrid	1138	5.4%	674	4.9%
Montpellier	821	3.9%	433	3.1%
Torino	17753	84.7%	11955	86.5%
<i>Total</i>	<i>20953</i>	<i>100.0%</i>	<i>13.823</i>	<i>100.0%</i>

Since the first section was actually used to check the respondent’s acceptance of privacy rules and data treatment plans, and the second one collected only personal





information not related to the main topic of the survey, the records offering at least some useful information are those where at least three sections were completed; Table 3.2 shows the completeness distribution for each city.

Table 3.2 – Number of compiled sections (9 = full questionnaire) in Survey 1

	Coimbra	Madrid	Montpellier	Torino	Total
0-2	31.7%	30.6%	37.8%	18.1%	20.4%
3	1.4%	2.6%	1.1%	4.3%	3.9%
4	1.0%	2.0%	3.2%	5.1%	4.6%
5	1.0%	1.3%	1.2%	2.1%	1.9%
6	0.8%	1.1%	1.2%	1.6%	1.5%
7	1.3%	0.6%	1.1%	1.1%	1.1%
8	1.5%	2.5%	1.7%	0.4%	0.6%
9 (complete)	61.3%	59.2%	52.7%	67.3%	66.0%
<i>Total</i>	<i>100.0%</i>	<i>100.0%</i>	<i>100.0%</i>	<i>100.0%</i>	<i>100.0%</i>

Also, the percentages shown here indicate the composition of the whole sample as originating from each city; these are not the response rates detailing what part of each population took part in the survey in each location. To obtain those, we must involve the size of the four academic communities, that include students as well as personnel, both temporarily and permanently employed. This is presented in Table 3.3, separately for each group forming the academic community. The values are “raw” in the sense that all those providing at least partial information (at least 3 sections compiled) are included.

It is easy to see that response rates varied wildly among cities as well as groups; in general, the technical and administrative staff was the most sampled group everywhere, as it is probably the group most often comply to indications from their superiors. Also, Torino displays the largest rates most probably because, as already mentioned. Survey 1 was there merged with the data collection for the official Mobility Plan, which is nowadays a formal requirement by law. Madrid has very good response rates as well but the reasons are probably different: it is by far the smallest institution of the four, making it easier to engage the relatively narrow community.

Table 3.3 – Response rates by role in the academic community in Survey 1

	Coimbra	Madrid	Montpellier	Torino
Student	1.6%	12.5%	2.0%	17.3%
PhD and temporary personnel	2.3%	9.1%	1.6%	24.4%
Professor/researcher	8.2%	35.6%	5.1%	33.1%
Technical-administrative staff	12.9%	46.5%	6.1%	57.5%
<i>Total</i>	<i>2.5%</i>	<i>16.6%</i>	<i>2.2%</i>	<i>19.2%</i>

Actually, what matters most in the context of an analytic comparison on the four universities is *not* the differing response rates among them; since results will always be computed separately for each one, the differing response rates in Coimbra, Madrid, Montpellier and Torino could only cause some uneven reliability of the results, but no bias would be implied. However, the different response rate *within* each university among the groups defined by roles could cause significant bias in the result for the whole communities, if and when the behaviour of the subgroups are differing. For example, if professors are overrepresented in the sample, and they commute by bicycle more than students, treating all units equally will result in a modal split which is too optimistic towards





cycling. To avoid this, a system of weights has been devised so to increase the relative importance of units pertaining to groups that are under-represented in the sample and, conversely, decrease that of units in the groups that have a much higher response rate. This is implemented separately for each university, since the subgroups response rates are not the same in all institutions, as can be immediately be seen in Table 3.3. The weights are computed so as to maintain the size of the sample for each location: summing weights for any university, the exact number of actual responses is obtained.

Let us now consider the composition of the sample concerning gender and age of the respondents. Table 3.4 show the gender distribution. Females are clearly prominent in the sample, even more than in the whole community, where they are a lesser majority. The lead is particularly strong in Torino, where male are reduced to less than one third of the sample, but the tendency is everywhere: females are more willing to participate to a collaborative effort such a long survey requiring a significant amount of time to be completed. Notice, however, that males are less prone to give up the questionnaire before completing it than females (the fully complete responses are around 75% for the latter, but the percentage goes up to 81% for males).

Table 3.4 - Gender of respondents in Survey 1

	Coimbra	Madrid	Montpellier	Torino
Female	64.8%	59.0%	60.1%	68.5%
Male	34.0%	41.0%	37.1%	30.6%
Not binary	1.1%	0.0%	2.8%	0.8%
Total	100.0%	100.0%	100.0%	100.0%

The analysis of the age distribution on a university community is clearly intertwined with the composition by group: if students prevail in the sample, this will lower the average age, and the opposite will happen in case of an over-representation of the personnel component.

Figure 3.1 - Age distribution in Survey 1

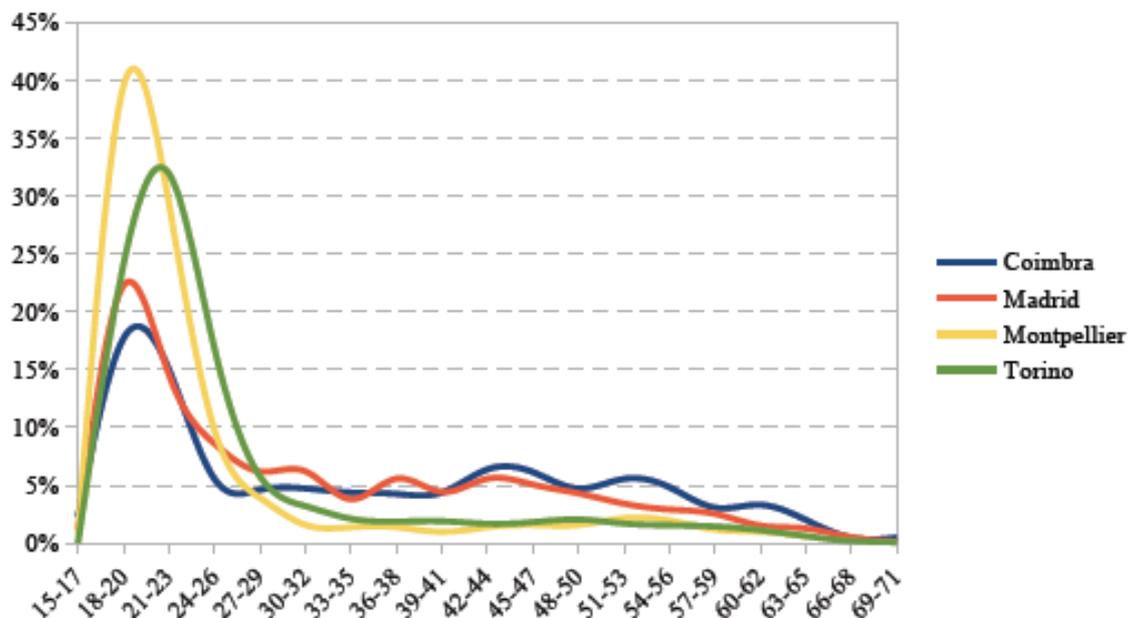




Figure 3.1 (cases are not weighted here) confirms this, as Coimbra and Madrid, that have both a better staff /student’s ratio and a better sampling rate on staff, display a much heavier tail beyond 29-30 years.

Finally, to set the mood for the following discussion, Survey 1 included a general question regarding people’s awareness on environmental issues - “How much do you feel the issues of environmental sustainability to be important for our society and a threat for the future?”. Possible answers were equally articulated, and ordered in terms of increasing sensibility to sustainability problems, as shown in Table 3.5.

While in general a large majority is everywhere significantly concerned about the environment, some differences do emerge, as the two smaller cities have more than half of the sample agreeing with the strongest statement, while the bigger cities Madrid and Torino lag a little behind. Coimbra, by the way, is the only city with less than 5% of the sample not particularly concerned with sustainability issues.

Table 3.5 - Environmental concerns of respondents in Survey 1

	Coimbra	Madrid	Montpellier	Torino	Total
Not very, I think the whole thing is being over-hyped	0.6%	2.0%	1.2%	0.7%	0.8%
They are just one of the problems facing society	3.0%	12.2%	8.8%	7.1%	7.2%
This is certainly of substantial importance	41.1%	44.3%	36.5%	52.7%	51.2%
Protection of the environment is actually the biggest challenge humans have to face right now	55.3%	41.5%	53.5%	39.5%	40.8%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

4. Commuting to university: the whereabouts of the journey

We can now start our exploration of the core topic of 3Cs, namely mobility, with a specific - but not exclusive - focus on forms of active mobility, conceived as any form of travel that involves a significant physical effort to get along: walking and cycling of course, but also the use of e-bikes, that require a lesser effort but still do not move by themselves, requiring the user’s continuous pedalling to keep moving. For the same reasons, e-scooter are instead excluded from the realm of active mobility, as they carry their driver with no need for any muscular effort.

Of course, the journey from home to a university campus (or other location of some of its branches) is something that is done *outside* of the university, and thus depends strongly on the city environments and the university location in them. Due to these reasons, the surveys explored in some detail with what kind of territorial context the commuter has to deal with during the journey, what are the distances to cover, how frequently they are actually covered. All such information is crucial to then understand and analyse the modal choices of the individual.

A specific section of the questionnaire was first of all devoted to get the “feeling” of the city where the university is based. A series of questions, in fact, detailed how much is the city agreeable, safe practical for users of active mobility:

Looking in general at the urban environment of your university city, how do you judge...

- The level of traffic congestion
- The level of compliance to speed limits and other road rules of car drivers
- The capillarity/efficiency of the public transport network
- The existence/quality of cycle paths/lanes
- The level of risk of bicycle theft
- The quality of sidewalks (are they spacious, clean, safely connected at crossroads)





- The quality/extension of pedestrian zones in the centre
- The quality/extension of public green spaces

All items were to be assessed on a 4-level ordinal scale; even though the level descriptions could vary for specific questions. Table 4.1 summarises all results.

Table 4.1 - University cities rating in Survey 1

Level of traffic congestion	<i>Coimbra</i>	<i>Madrid</i>	<i>Montpellier</i>	<i>Torino</i>
Unbearable	11.0%	13.2%	11.2%	11.4%
Quite bad	29.4%	38.2%	35.9%	38.6%
It's a nuisance, but you can live with it	43.6%	27.7%	40.8%	41.0%
Not really a problem	15.9%	21.0%	12.1%	9.0%
Level of compliance to speed limits and other road rules of car drivers	<i>Coimbra</i>	<i>Madrid</i>	<i>Montpellier</i>	<i>Torino</i>
Terribly poor	9.4%	7.5%	16.9%	18.0%
Rather poor	35.0%	33.0%	51.3%	46.2%
Quite good	51.1%	51.4%	30.4%	33.4%
Very good	4.5%	8.1%	1.5%	2.4%
Capillarity/efficiency of the public transport network	<i>Coimbra</i>	<i>Madrid</i>	<i>Montpellier</i>	<i>Torino</i>
Terribly poor	24.0%	13.4%	2.7%	15.8%
Rather poor	42.7%	26.6%	20.6%	37.6%
Quite good	30.6%	43.1%	64.8%	43.3%
Very good	2.7%	16.9%	11.8%	3.3%
Existence/quality of cycle paths/lanes	<i>Coimbra</i>	<i>Madrid</i>	<i>Montpellier</i>	<i>Torino</i>
Terribly poor	39.1%	16.1%	3.3%	15.3%
Rather poor	40.3%	32.9%	30.7%	37.8%
Quite good	14.4%	37.1%	51.5%	27.8%
Very good	1.7%	6.3%	7.2%	2.7%
Level of risk of bicycle theft	<i>Coimbra</i>	<i>Madrid</i>	<i>Montpellier</i>	<i>Torino</i>
You are under the constant fear of having your bike stolen	3.6%	6.6%	31.0%	23.6%
It makes you quite worried	18.1%	20.5%	28.5%	38.5%
It can happen but I would not say that it is my main worry	61.0%	49.3%	36.5%	32.9%
It is not really a problem	17.3%	23.6%	4.0%	5.0%
Quality of sidewalks (spacious, clean, safely connected for pedestrians at crossroads)	<i>Coimbra</i>	<i>Madrid</i>	<i>Montpellier</i>	<i>Torino</i>
Terribly poor	9.2%	3.3%	9.1%	8.1%
Rather poor	28.7%	17.8%	44.9%	29.9%
Quite good	55.0%	58.4%	43.9%	55.8%
Very good	7.2%	20.4%	2.1%	6.1%
Quality/extension of pedestrian zones in the centre	<i>Coimbra</i>	<i>Madrid</i>	<i>Montpellier</i>	<i>Torino</i>
Terribly poor	6.1%	2.5%	1.1%	3.8%
Rather poor	24.4%	15.9%	9.1%	14.8%
Quite good	59.3%	59.5%	54.2%	65.4%
Very good	10.3%	22.2%	35.7%	15.9%
Quality/extension of public green spaces	<i>Coimbra</i>	<i>Madrid</i>	<i>Montpellier</i>	<i>Torino</i>
Terribly poor	5.6%	3.8%	5.7%	5.3%
Rather poor	17.3%	17.7%	37.3%	21.1%
Quite good	60.2%	53.6%	48.7%	59.3%
Very good	16.9%	24.9%	8.2%	14.3%

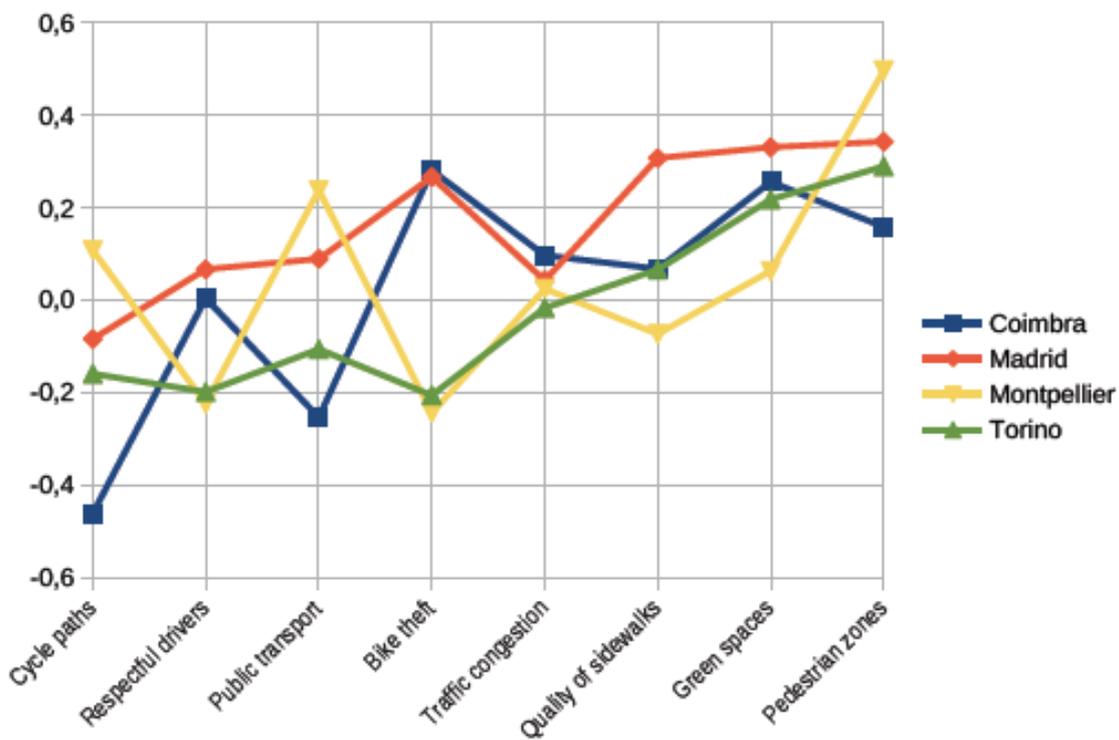
In all distributions the modal response has been highlighted in bold to facilitate the reading of the table. Of course, in some cases the modal response does represent only a relative majority. To have a more concise glimpse of the situation, the four-level ordinal





scale was converted into a -1/+1 metric, where -1 indicates an aspect that is felt to be really bad, and vice versa a positive unit value highlights a very good opinion. On this (somewhat arbitrary) metric, values lower than zero of the average judgment indicate a prevalence of negative judgments, and vice versa averages with a value higher than zero. Figure 1 offers a comprehensive display of the city averages for all aspects considered. The items are ordered based the increasing average (among all cities) rating from left to right. On certain items, ratings are similar for all cities, while for others they differ significantly. Traffic congestion is the one that shows very close ratings everywhere: quite surprisingly, negative opinions do not prevail, as all values are close to zero. We must remember that this is an average, and it can “hide” very different distributions: for example in this case Madrid has a group stating that traffic is *not* a problem which is more than double compared to Torino (21% versus 9%) but the other percentages behave differently and bring the two averages quite close. Other items show more heterogeneous ratings, like the risk of having your bicycle stolen, which is considered rather critical in Torino and Montpellier, but much less so in Madrid and Coimbra. Public transport and Cycle path are in same vein, particularly contrasting Montpellier as quite good while and Coimbra fares badly on public transport and cycle paths. On the contrary, Montpellier (as well as Torino) fares badly regarding bicycle theft and the degree of respect for walkers and cyclists by car drivers.

Figure 4.1 - University cities average rating - Survey 1



Some other information was collected on individual details, like the distances to be covered to commute to university and that from home to the nearest public transport stop useful to go there; the presence of bike sharing services; whether the interested route was flat or hilly, congested by motorised traffic and what part of it was feasible along safe cycle paths. Such a bundle of information allows to evaluate how welcoming for active movers is the home-to-university journey: the ideal case being a medium-short length, flat, safe and traffic free itinerary.





The commuting distances towards campuses are on average shorter for smaller cities like Montpellier and Coimbra, with Madrid displaying the longest trips, due both to the sheer size of the city as well as to the presence of an out-of-town campus at Josè Camilo Cela university. Madrid is in fact the only case where only a minority (20%) of journeys are completed within 5 km from home, i.e., distances easily covered by active mobility; even Torino, the second largest city here, has almost half of its journeys within such limits. Things reverse for Montpellier and Coimbra, where around 70% of respondents have only short trips to do.

Obviously, even though active mobility can be exploited also in multimodal fashion, these differences should be affecting the modal split, together with many other factors. The same can be said of the availability of close to home public transport facilities with efficient connections to the campus (Table 4.2), where a similar pattern emerges: Madrid is the case where access to public transport may not be so close (26% of the sample lives further than 5 kms. from the access to public transport going to the campuses): in all other cities at least half of the community has a home very close to public transport access that can be used for the journey to university.

In this case, however, it should be noticed that the question has a high degree of implicit subjectivity, since it is ultimately up to each respondent to define what can be considered “the most reasonable public transport stops to reach your campus”, which at least potentially is not simply the nearest bus, metro or train stop/station; the service should at least be the first connection of an itinerary carrying to the campus with acceptable efficiency.

Table 4.2 - Home-to-University distances - Survey 1

	Coimbra	Madrid	Montpellier	Torino
Up to 1 km	22.2%	3.9%	18.8%	10.5%
Up to 3 km	28.8%	5.2%	30.3%	19.4%
Up to 5 km	15.9%	10.9%	23.1%	16.6%
5 - 15 km	15.4%	19.1%	18.2%	20.3%
15 - 20 km	3.9%	11.5%	2.9%	6.5%
20 - 30 km	3.5%	17.3%	1.8%	6.7%
30 - 50 km	4.1%	14.9%	3.3%	8.9%
Over 50 km	6.1%	17.1%	1.6%	11.1%
Average distance (km.)	9.9	24.9	6.6	16.4

Table 4.3 - Distance to public transport stop to go to University - Survey 1

	Coimbra	Madrid	Montpellier	Torino
Up to 500 mt	61.3%	38.4%	52.3%	50.2%
Up to 1 km	16.1%	17.3%	17.2%	17.0%
Up to 2 km	8.3%	10.0%	9.3%	8.6%
Up to 5 km	4.0%	8.3%	9.5%	7.6%
Over 5 km	10.3%	25.9%	11.6%	16.7%
Average distance (km.)	1.26	2.48	1.54	1.82

Next, let us consider a series of information more directly linked to active mobility, cycling in particular. Its aim is to understand whether the infrastructural conditions of the home-to-campus itineraries are reasonably favourable to active mobility. With regard to the route’s gradient, the moral values in Table 4.4 by and large reflect the actual situation on the map, with Torino seen as fully flat by a significant majority, Madrid and Montpellier





characterised by a large presence of gentle slopes, and Coimbra with the main campus places on top of a rather steep hill.

Concerning the part of the journey that can be covered travelling on safe cycling infrastructure (Table 4.5), only Montpellier has a majority of respondents that can go along a route including more cycling path than normal roads (56.7%). The contrast is stark with Coimbra, where the same positive conditions for cycling is enjoyed by only 13.7% of the sample. Less expected is the relatively better situation of Madrid compared to Torino, especially due to a higher percentage of respondent saying that they can commute *entirely* on cycle paths (18% in Madrid while only 4.5% in Torino. This is not explainable by the total length of cycle paths in the two cities, which is similar, but with Madrid being three times bigger in terms of population.

Table 4.4 - Gradient of the route towards University - Survey 1

	Coimbra	Madrid	Montpellier	Torino
It's all flat	5.3%	20.1%	26.6%	62.8%
A bit hilly, gentle slope	17.7%	39.4%	43.8%	25.0%
Quite hilly, some significant climb to do	64.3%	31.3%	24.1%	9.4%
Very hilly, steep slopes	12.6%	9.2%	5.5%	2.8%
Total	100.0%	100.0%	100.0%	100.0%

Table 4.5 - Part of the itinerary towards university with cycle path available - Survey 1

	Coimbra	Madrid	Montpellier	Torino
None	49.9%	22.5%	11.0%	25.3%
Less than half	26.2%	33.6%	15.3%	40.9%
About half	10.2%	15.0%	17.0%	17.7%
More than half	6.8%	11.1%	23.1%	11.6%
All of it	6.9%	17.8%	33.6%	4.5%
Total	100.0%	100.0%	100.0%	100.0%
Average %	23.7%	42.1%	63.3%	32.3%

An attempt to complete the picture in terms of a favourable environment for cycling is made by enquiring about how dangerous traffic is perceived to be in the part of the commuting itinerary that is *not* doable on cycle paths (Table 4.6). The two pieces of information are in some cases positively interrelated, as proved for example by Coimbra: whereas this city has a low figure for cycle paths, it is also the best in term of little traffic congestion, making the context somehow less critical when the two aspects are combined. Madrid as well seems to have quite good traffic conditions, somewhat surprising for a national capital mega-city; but the one that fares worse is Torino, where people that feel streets taking to the many locations of the local university and do not have a cycle path are quiet are just a very small minority. Here also, those considering traffic outright dangerous are almost *seven times* as many than the previous group.

Some further doubts on the reliability of this outcome arise when comparing it with the general, multi-faceted assessment of the city reported in Figure 4.1: there, traffic congestion was declared to be almost equally problematic in all four locations, with Torino faring only slightly worse than the others.





Table 4.6 - Traffic in the itinerary towards university with no cycle path available - Survey 1

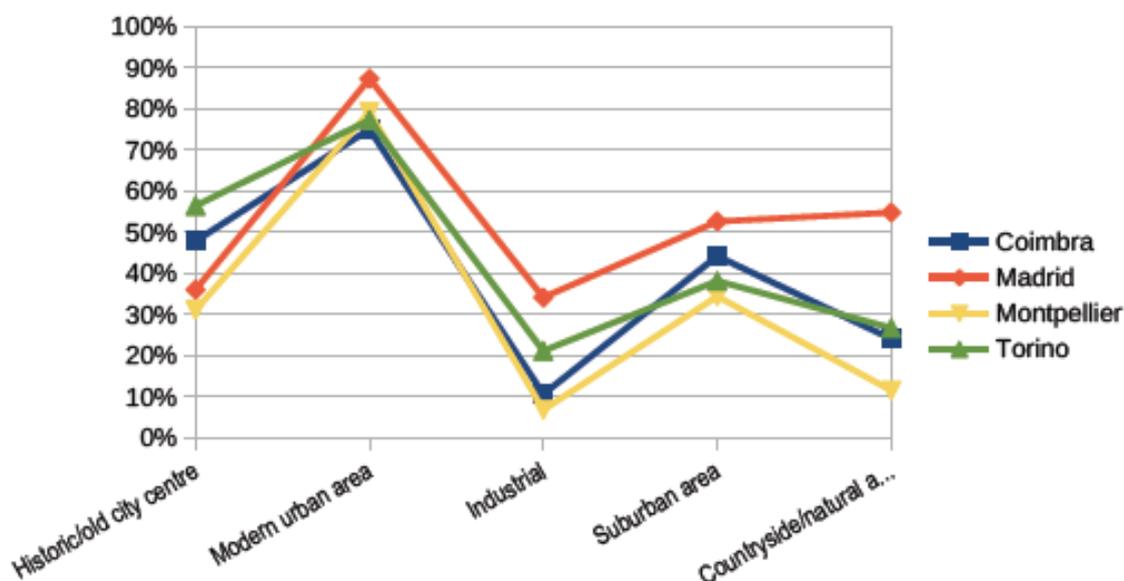
	Coimbra	Madrid	Montpellier	Torino
Very quiet, no actual danger	64.8%	52.4%	28.7%	6.0%
Somewhat busy, pedestrians and cyclists need to be careful	27.8%	41.3%	58.0%	53.1%
Traffic is heavy and/or fast, walking and cycling are quite dangerous	7.4%	6.3%	13.4%	40.9%
Total	100.0%	100.0%	100.0%	100.0%

Table 4.7 monitors the perceived availability of bike sharing services near enough to one’s home to be an actual alternative to other modes of transport, even if most previous research show that on such repetitive, (almost) daily routine journeys as home to work/school commuting, sharing services in general are seldom used. The emerging picture has only the Montpellier community enjoying a majority of people that has easy access to such services (non-distinction was made between *station based* and *free-floating* ones). Still, as said above, even in the worst case where less than 40% of the respondents have close-by access to shared bicycles, the fraction actually using them is really much lower than that¹.

Table 4.7 - Availability of bike sharing services near home - Survey 1

I usually can find shared bikes...	Coimbra	Madrid	Montpellier	Torino
... close to home (within 500 m.)	18.6%	25.2%	37.1%	20.1%
... near my home (within 1 km).	19.9%	19.3%	27.1%	24.2%
There are no shared bikes available near my home	61.5%	55.5%	35.9%	55.6%
Total	100.0%	100.0%	100.0%	100.0%

Figure 4.1 - Types of surroundings transited while in route to University - Survey 1



¹ This will be discussed in detail later, but the share of bike-sharing, including both normal as well as electric bikes, and including both unimodal and multimodal partial use, is 0.37% on the whole sample of Survey 1.





Finally, respondents were asked to specify what kind of environments they passed through in their journey to the campus. Five types of comprehensive surroundings were proposed, allowing to mention any number of them. Figure 4.2 shows only limited differences among the four cities, with *Modern urban areas* being the most traversed in all cases, and a somehow more frequent indication for *Industrial* and *Countryside* in Madrid due to the presence of an extra-urban campus.

5. The option set: mobility, a constrained choice

The selection of a *mode* - or a combined sequence of modes - to travel to any destination is actually a matter of personal choice *if* there are alternatives that the individual can afford, both in term of cost as well as of availability not depending on his/her will. You cannot choose to travel by car if you are unemployed and cannot afford to buy one, and maintain it in working condition; you cannot take the train if a train line is nowhere in sight where you live, or if no train line brings you reasonably close to your destination. These common-sense considerations motivate the enquiry into the actual alternatives that respondents could choose for their commuting to university sites. Of course, things can change with time: you can decide to buy a bicycle with a small expense, or a car with a bigger one. So, the option set is actually referred to the exact moment the survey is submitted to you; it can change quite rapidly with the purchase decision of private vehicles, and much more slowly due to modifications in the public transport network at your disposal. Due to this, the questionnaire combines questions on which mobility modes are available to you *right now*, with some enquiries about the possible plans to buy new means of transport in the near future.

Being here focused on active mobility, of course, bicycles were the main object of interest. As such, a detailed classification was considered for them, with four categories combining the distinction between muscular and e-bikes with that between full frame and folding ones. Table 5.1 shows the degree of possession of each type - or combination of types, when people own more than one bicycle - in the sample. Torino shines as the only city where more than half the people own at least a bicycle, but of course this is just possession, saying nothing about actual use. If we split the groups based on the number of types owned, it is Coimbra that ranks first, with 13.8% of those owning a bicycle that actually have at least two different types at their disposal.

Table 5.1 - Possession of bicycles by type - Survey 1²

Types owned	Coimbra	Madrid	Montpellier	Torino
Bicycle	27.3%	35.7%	31.7%	45.8%
E-bike	2.2%	2.0%	3.9%	1.1%
Bicycle - E-bike	1.8%	0.9%	2.9%	1.1%
Folding e-bike	1.4%	0.6%	0.6%	0.3%
Folding bike	0.8%	0.1%	0.6%	1.3%
Bicycle - Folding e-bike	0.8%	0.0%	0.0%	0.1%
Bicycle - Folding bike	0.5%	1.0%	0.6%	1.1%
Bicycle - E-bike - Folding bike	0.1%	0.1%	0.0%	0.1%
E-bike - Folding bike	0.1%	0.0%	0.0%	0.1%
Folding bike - Folding e-bike	0.1%	0.0%	0.0%	0.0%
Bicycle - E-bike - Folding bike - Folding e-bike	0.0%	0.4%	0.0%	0.0%
E-bike - Folding e-bike	0.0%	0.1%	0.0%	0.0%
Total	35.2%	41.0%	40.3%	51.0%

² All combinations that had less than 0.1% of cases in all cities were omitted.





This is rather unusual in Torino instead, where only 5.4% of those owning some bicycles are actually owner of two or more. In any case, at a given moment in time this could be considered the upper bound for the modal split for cycling; but of course, as mentioned before, any individual even with a relatively low budget available could decide to purchase a bicycle. As mentioned, the survey probed this possibility as well.

In this light, Table 5.2 describes the responses to the question “What of the following items are you considering to buy in the near future?”, again considering the different bicycle types. The structure of the Table 5.2 is the same as the previous one, but the emerging story is quite different: while ownership of e-bikes is still significantly limited when compared to traditional bicycles, purchasing plans show them taking the lead in both Coimbra (the city with the steepest climbs of the four) and - even more - in Madrid, which is still somewhat hilly but, most importantly, has longer distances to cover due to its sheer size. Madrid is also the city where future trends look positive, as it is the only location where there are more people planning to buy bicycles than already owning them. Also in Madrid folding bikes look almost non-existent right now (only 0.7% of the sample owns them, both normal or electric), but the segment should be due for a rise, as 12.8% of the sample declares it to be on their shopping list. In contrast, Montpellier and Torino appear to be more conservative, with lower buying intentions and still a prevalence of purchases of traditional bicycles. This is reflected also by the intentions to buy *more than one* bicycle type, being around 20% of the cases in Madrid and Coimbra, but only half that figure in Montpellier and Torino.

Table 5.2 - Plans to buy bicycles by type - Survey 1

Types that are planned to be purchased	Coimbra	Madrid	Montpellier	Torino
E-bike	11.5%	17.2%	6.3%	5.1%
Bicycle	10.5%	9.5%	11.7%	14.3%
Folding e-bike	4.5%	10.1%	0.8%	1.5%
E-bike - Folding e-bike	3.3%	4.6%	0.4%	0.5%
Bicycle - E-bike	1.9%	1.6%	0.4%	0.8%
Folding bike	0.9%	2.7%	0.8%	3.2%
Bicycle - Folding bike	0.2%	0.3%	1.0%	0.7%
E-bike - Folding bike - Folding E-bike	0.2%	0.9%	0.0%	0.1%
E-bike - Folding bike	0.2%	0.5%	0.2%	0.2%
Bicycle - E-bike - Folding bike - Folding e-bike	0.1%	1.5%	0.2%	0.2%
Folding bike - Folding e-bike	0.1%	0.5%	0.2%	0.3%
Bicycle - E-bike - Folding bike	0.0%	0.3%	0.0%	0.0%
Bicycle - E-bike - Folding e-bike	0.0%	0.1%	0.0%	0.0%
Bicycle - Folding e-bike	0.0%	0.3%	0.0%	0.1%
Total	33.6%	50.0%	21.9%	27.0%

A third aspect - and a very important one from the point of view of mobility policies - concerns the potential incentive that can be given to purchase plans through subsidizing.

In fact, people were asked if economic incentives could motivate them to purchase some kind of bicycles. This is reported in Table 5.3, with the same approach of Tables 5.1 and 5.2.

The “future” trend for e-bikes is again very clear everywhere, and this time also the folding e-bikes - and the combination of e-bike and/or folding e-bikes rank higher than





normal bicycles; as prices for such bicycles are still higher, the interest for them is increased significantly by the cost reduction that such incentives would entail. Also, the differences between table 5.2 and 5.3 give us a more precise idea of what the effect of economic incentives could be: for the total percentages, the increase ranges from the +54% (from 50 to 77%) of Madrid to the +130% of Torino (from 27 up to 62%!), with increases for the two smaller cities both being over +100%. However, these global positive variations for all cities, when decomposed by bicycle type, can also be the sum of opposing shifts: while for e-bike all differences in purchasing plans induced by economic incentives are strongly positive (e.g. for Torino, which has the lowest value of the four, the percentage *more than triples*, going from 5% to 17%), for normal bicycles Coimbra and Madrid display a contrasting outcome: here the purchasing intentions for those actually *decrease* when assuming a bonus is available, since this is allowing to afford an e-bike instead. In Madrid, for example, purchasing plans for normal bicycles goes from 9.5% down to 6.5%.

All such eagerness is however very good news if coming from people who did not possess a bicycle before: a substitution effect on bike owners that upgrade their bicycles to better quality products is obviously of much less interest, as its effect on the modal split will probably marginal (supposing some people will use the new, better bicycle more frequently than the older one). To check this, data were processed to obtain values in Table 5.4. where respondents are classified as:

- “Not owner, no purchase”: people that don’t own a bicycle at the moment and don’t have plans to buy one
- “Owner, no purchase”: people owning a bicycle already, with no plans to buy others
- “Upgrade”: people that already have a bicycle but plan to buy a new one
- “Upgrade with bonus only”: this represents those already owning a bike, that will upgrade to a new one only if some incentive will be available
- “New acquisition”: people who plan to buy a bicycle and do not possess one at the moment
- “New acquisition only with bonus” finally, the last category fits those with no bike right now, and who are willing to buy one only if incentives were offered.

Table 5.3 - Willingness to buy bicycles if economic incentives are in place - Survey 1

Types that are planned to be purchased	Coimbra	Madrid	Montpellier	Torino
E-bike	27.1%	25.9%	16.4%	17.7%
Folding E-bike	16.3%	25.9%	3.1%	6.3%
E-bike - Folding E-bike	8.7%	8.2%	2.2%	2.7%
Bicycle	8.0%	6.1%	14.7%	17.6%
Bicycle - E-bike	2.7%	2.2%	4.3%	3.0%
Bicycle - E-bike - Folding Bike - Folding E-bike	2.6%	2.9%	1.8%	1.3%
Folding Bike	1.8%	1.1%	1.4%	7.5%
E-bike - Folding Bike - Folding E-bike	1.5%	2.2%	0.8%	1.1%
Bicycle - Folding Bike	0.7%	0.1%	1.8%	2.1%
Bicycle - E-bike - Folding E-bike	0.5%	0.5%	0.2%	0.2%
Bicycle - E-bike - Folding Bike	0.2%	0.0%	0.4%	0.3%
Bicycle - Folding E-bike	0.2%	0.6%	0.0%	0.2%
E-bike	0.1%	0.0%	0.0%	0.0%
Folding Bike - Folding E-bike	0.1%	0.9%	0.4%	1.3%
Bicycle - Folding Bike - Folding E-bike	0.0%	0.0%	0.2%	0.1%





E-bike - Folding Bike	0.0%	0.5%	0.4%	0.7%
Total	70.7%	77.2%	47.9%	62.1%

Actually, the segment of interest to an administrator that is considering activating economic incentives for the purchase of bicycles is the last one in Table 5.4. All the others either will not buy even when subsidized, or will buy anyway with no need for subsidizing. In the end, most people declaring the intention to buy a bicycle were *not* already owners of older bicycles everywhere, except in Torino (where 32.4% want simply to upgrade their previous bicycles, while only 18.6% are actually en course to buy their first ever two-wheeler); this majority is particularly strong in Coimbra, where new acquisition plans are 31.6% compared to only 17% of upgrades. Such trend is of course good news, as it entails that the number of people owning bicycles is due to increase significantly in the near future. There is no guarantee that the new bikes will replace cars in the home-to-university commuting, but still ownership is a necessary pre-condition that allows more people to consider and possibly choose this option - unless we consider the systematic use of bike sharing services, that have however a minuscule modal share, as well as costs that make them probably more expensive than the purchase of a personal bicycle in the long-medium term.

Having considered in detail bicycle ownership, let us now consider also car possession. Due to its much higher purchasing and maintenance costs, it is appropriate to check whether the different roles in the academic communities imply a large gap in car ownership descending from the varying budget constraints. As can be seen in Table 5.5, in all cities most students do not have access to a car for the journey to their university branch, down to the case of Torino where only 22% of them enjoy this option. Torino is the case having the lowest rates of car possession as well (these figures do not sum up to 100, and can be all very low or very high); Coimbra and Madrid in particular have very high possession rates for their staff, topping at around 90%.

Table 5.4 - Replacement vs. new acquisition of bicycles - Survey 1

	Coimbra	Madrid	Montpellier	Torino
Not owner, no purchase	44.4%	41.8%	57.5%	39.6%
Owner, no purchase	7.0%	4.3%	11.7%	9.3%
Upgrade	7.4%	14.2%	5.6%	12.1%
Upgrade only with bonus	9.6%	10.0%	7.8%	20.4%
New acquisition	15.5%	20.6%	8.0%	10.0%
New acquisition only with bonus	16.1%	9.1%	9.4%	8.6%
Total	100.0%	100.0%	100.0%	100.0%

Table 5.5 - Car ownership percentages by city and role in the community - Survey 1

	Coimbra	Madrid	Montpellier	Torino
Student	33.1%	37.2%	28.6%	21.7%
PhD and temporary personnel	71.3%	50.0%	68.8%	35.1%
Professor/researcher	91.1%	80.8%	82.4%	70.1%
Technical-administrative staff	88.6%	89.3%	76.5%	62.8%
Total	43.3%	44.8%	33.3%	24.8%





6. The modal split in home-to-university commuting

It is now time to examine the core issue, i.e., what are the modes of transport adopted by the university community in their journey towards campuses and other university branches. As before, we are more interested in active mobility (walking and cycling) which will be examined in more detail, but all modes will be considered to fully understand the prevailing behaviour. Also, the analysis will distinguish *unimodal* journeys from multimodal ones, i.e., those where multiple modes are combined to cover a journey that no single mode among these adopted could efficiently cover.

In this regard it appropriate to notice that, while unimodal car use (that is travelling by car “from door to door”) it is considered the least sustainable solution, multimodal journeys can often include a car section in contexts where it would be difficult to find an alternative. More generally, it is reasonable to say that multimodality is closely linked to sustainability, since sustainable modes, roughly divided into active mobility and public transport, are in many instances not feasible as unimodal solutions: the first for the limited distances that can be covered, and the second for the necessity to start and finish in fixed locations that cannot always be next to home and the campus. In this fashion, fully sustainable journeys of some length are often a combination of the two, with active mobility typically assuming the role of the so-called “first mile” and/or “last mile” to connect with public transport hubs.

First, Table 6.1 shows the divide between unimodal and multimodal journeys. While it is clear that multimodality is present everywhere, significant differences emerge, that can again be read based on the different sizes of the four cities: small cities imply shorter distances and thus higher feasibility of unimodal commuting, while Torino and even more Madrid feature very high proportions of multimodality. Frequencies of both two- and three-modes journeys are substantial, with combinations of four or even more modes still quite relevant at least in Madrid (9.2%).

Second, we take a concise snapshot of the active mobility modal share for home-to-campus commuting; this is graphically rendered in Figure 6.1. where the modal shares for walking and cycling are separately displayed, and are then split between unimodal and multimodal use of these modes. Before examining the results, consider that this means these percentage include all journeys that could include just a short stretch of walking, i.e., a first mile that allows the traveller to catch a train or other public transport that would then cover the lion’s share of the journey. So, these are the highest possible values we can get, including journeys where active mobility could represent a minimal part of the whole. Also, to avoid the indication of trivial walking sections, e.g., just to get out of home and reach a car parked a few meters away along the street, the questionnaire explicitly stated that a walk mode section was to be indicated only when people actually did at least ten minutes on foot (which at normal, unhurried speed means some 600-700 meters).

Table 6.1 - Multimodality in the home-to-university commuting - Survey 1

Is your journey to the University usually composed of a single or many sections?	Coimbra	Madrid	Montpellier	Torino
Only one	65.3%	37.2%	70.0%	50.5%
Two	22.2%	30.9%	19.4%	29.1%
Three	10.1%	22.7%	7.1%	15.8%
Four	1.4%	4.9%	2.2%	4.0%
More than four	1.0%	4.3%	1.3%	0.7%
Total	100.0%	100.0%	100.0%	100.0%

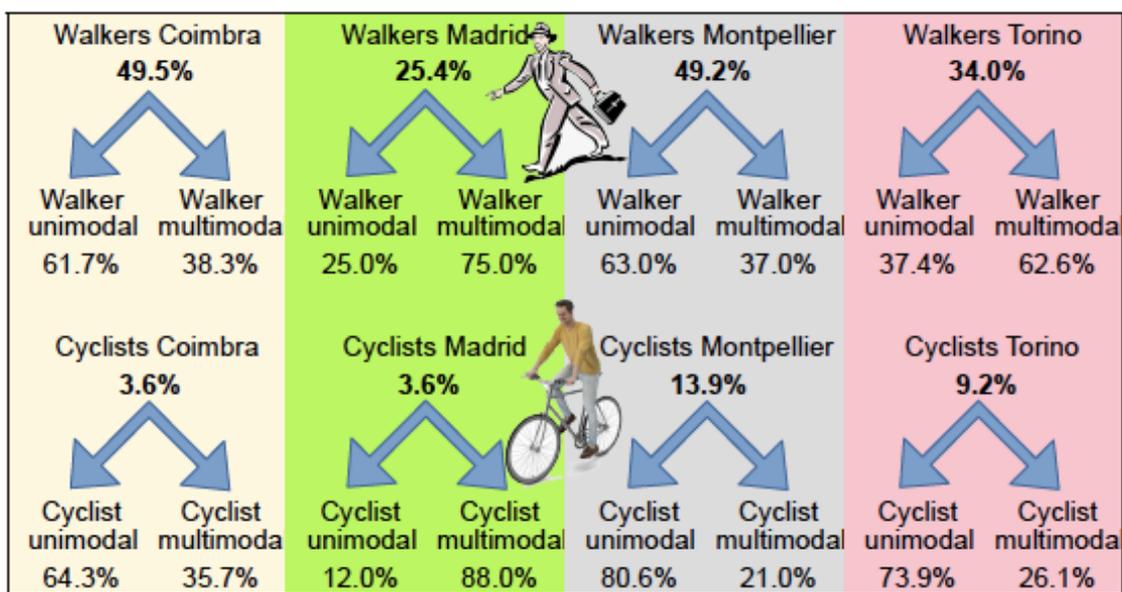




Notice that values reported in Figure 6.1 distinguishing unimodal from multimodal are conditional; so, for example in Coimbra more than 49% of the sample walks some distance to university and, of those 49.5%, almost two thirds (61.7%) do the entire transfer on foot, while the remaining 38.3% combines walking with other modes to reach the university destination.

As could be expected, the walk shares are much higher than that of bicycles, especially in the smaller cities of Montpellier and Coimbra, while sheer distances limit the possibility of “walk-only” commuting in big cities. This is reinforced by the unimodal-multimodal split, which behaves in the opposite way in Madrid, where three quarters of commuters who walk do so only for a part of the journey, and also in Torino, albeit less strongly.

Figure 6.1 - Active mobility in the home-to-university commuting - Survey 1



Moving to cycling shares, the contrast is this time between Coimbra and Madrid on one side and Montpellier and Torino on the other, with Montpellier leading the way with 14% of people on bicycles, 80.6% of them covering the whole journey that way. Here it’s only Madrid that reverses the outcome, with almost 90% of bicycle instances that are multimodal; all other three cities have a prevalence of unimodality for cycling³.

Besides the questions regarding the modal share, some further enquiries were included on active mobility, to gain more information on the actual importance of it in the travelling combinations recorded. In fact, respondents who walked or cycled in multimodal fashion (unimodal active mobility is not considered here) were asked what percentage of their journeys was actually covered by such modes. The resulting values look quite substantial everywhere, peaking at 37% for cycling in Torino.

³ It should be noted that given the limited share of cycling in Madrid and Coimbra, combined with a sample size that hovers around 700 unit in both cases, implies having to deal with about 25 cases regarding bike users. It is therefore necessary to take strong caution when dealing and interpreting results about the cyclists behaviour from these cities, given the weak statistical reliability of such small subsamples. Data for Montpellier regarding cyclist is a bit more abundant (around 60 units), and has no such problem for Torino (more than 1300 cases).





Table 6.2 - Active mobility average share in multimodal home-to-university commuting - Survey 1

	Coimbra	Madrid	Montpellier	Torino
Walking	24.9%	17.9%	29.2%	22.0%
Cycling	24.2%	23.0%	30.9%	37.0%

We complete the analysis of the role of active mobility in the commuting habits of the academic communities by checking what differences exist among the different roles (students, professors, etc.). Table 6.3 shows separated percentages for walking and cycling (all cases, both unimodal and multimodal) by role and city. To help easily visualising the outcomes, cells are coloured on a scale from deep red (lowest values, worst cases) to deep green (highest values, best cases), so that yellow cells contain middle of the road figures.

Table 6.3 - Active mobility in the home-to-university commuting by role - Survey 1

<i>Walkers (all)</i>	<i>Student</i>	<i>PhD / grants</i>	<i>Professor/ researcher</i>	<i>Staff</i>
Coimbra	50.1%	32.4%	22.2%	20.0%
Madrid	25.4%	11.1%	9.1%	7.1%
Montpellier	44.5%	43.8%	17.6%	17.6%
Torino	34.6%	29.8%	28.8%	27.0%
<i>Cyclist (all)</i>	<i>Student</i>	<i>PhD / grants</i>	<i>Professor/ researcher</i>	<i>Staff</i>
Coimbra	2.1%	10.2%	4.4%	2.9%
Madrid	3.4%	0.0%	2.0%	0.0%
Montpellier	9.1%	31.3%	41.2%	41.2%
Torino	8.2%	24.7%	20.2%	13.4%

Even exercising caution due to the small number of cases, there is a clear, similar pattern for all cities, whereas students walk more than other groups. Cycling is a bit more heterogeneous, as in Madrid it is slightly more common among students; at the same time Montpellier stands out due to professors and staff enjoying a very high rate for personnel, while the figure for students is good (still the best of the lot), but decidedly lower. In the end, notwithstanding the younger age, more limited budget and consequently limited access to cars, students modal share for active mobility shows wide margins for improvement.

Let us now examine the full modal split regarding university commuting, a context where active mobility is only a part of a larger picture. To have a good representation of the modes used we must put together those selected unimodally, and those combined into multimodal travel solutions. Moreover, the survey gives us also the “modal chain”, i.e., the chronologically ordered sequence of modes adopted to reach the campus; in the merge, the single modality of unimodal travellers is equated to the first mode of the chains of multimodal travellers.

In Table 6.5 the most important modal chains (including single modes) are reported with the frequency they have in each city. Since the mode list submitted to respondents





was very detailed, including 23 different items, the possible modal chains number in the thousand, and even considering those actually used by someone the count goes up to 700. In the table, therefore, only a selected few are listed, based on the largest global numbers of commuters adopting them.

Most unimodal solutions appear at the top of the list, since multimodal journeys are dispersed on a large number of different combinations. This is reinforced by the fact that the survey asked to indicate as different sections of the journey a combination of public transport vehicles, even if of the same type. So, for example, if you take three different urban buses to reach the campus, this is recorded as multimodal with three sections.

Driving your car alone to university is very much in use in Coimbra and Madrid, being the choice of more than a quarter of the sample; it is decidedly less common in Montpellier and Torino. Interestingly, using the car but travelling together with other people is prevailing in the same cities, and especially in Coimbra (10.2%).

In general, the fine detail of Table 6.5 does not allow to easily gain a comprehensive, general overview of the mobility choices being studied. To do this, the 23 modes were merged into four macro-categories: a) Active/micro mobility; b) Sharing mobility (of any kind) c) Private motorised; d) Public transport. Further, multiple instances of the same public transport service were counted just once, and the modal order was dropped as well. In this way a more concise framework was obtained, with only 13 categories, as shown in Table 6.4. Here, the combinations of two or more items are in no particular order.

Table 6.4 - Simplified modal split for university commuting - Survey 1

Macro-modes	Coimbra	Madrid	Montpellier	Torino
Public Transport	13.4%	35.3%	28.5%	34.2%
Active/micro	30.8%	8.2%	47.8%	24.8%
Private motor	40.1%	35.7%	7.7%	13.5%
Active/micro + Public Transport	7.0%	13.4%	12.6%	14.4%
Public Transport + Private motor	3.4%	4.2%	0.9%	6.7%
Active/micro + Public Transport + Private motor	1.4%	0.7%	1.9%	4.5%
Active/micro + Private motor	3.2%	0.4%	0.2%	1.5%
Sharing	0.5%	1.1%	0.4%	0.3%
Sharing + Public Transport	0.0%	0.7%	0.0%	0.1%
Active/micro + Sharing	0.1%	0.1%	0.0%	0.1%
Active/micro + Sharing + Public Transport	0.1%	0.1%	0.0%	0.1%
Sharing + Public Transport + Private motor	0.0%	0.0%	0.0%	0.01%
Active/micro + Sharing + Private motor	0.0%	0.0%	0.0%	0.01%
Total	100.0%	100.0%	100.0%	100.0%

A glimpse at Table 6.4 immediately shows how the three main macro-modes are combined in quite different fashion in each city:

- Car use and public transport are on a par in Madrid, with active/micro a distant third - although it regains some relevance when used as first/last mile combined with public transport;
- Coimbra has the largest share of car unimodal use, but also a strong active mobility ratio, even if the walking part is absolutely dominant. Public transport lags behind





when compared with the other cities, both unimodal as well as in combination with active mobility;

- Montpellier ranks at the top regarding active mobility, both as walking as well as cycling. It boasts also the lowest car use of all;
- Torino stands in the middle, featuring a strong public transport use, both unimodal and combined with active mobility, on a par with Madrid. but has a much lower car use than the latter, with a more positive figure per active mobility;
- Sharing mobility as a macro-mode fare very low, not only in unimodal fashion, but also a complement to other modes. It caps at 1.1% (unimodal) in Madrid, with all other cities lagging behind.





Table 6.5 - Detailed modal split for university commuting - Survey 1

Mode 1	Mode 2	Mode 3	Mode 4	Coimbra	Madrid	Montpellier	Torino
Walk				25.9%	6.1%	30.0%	14.0%
Car (alone)				27.7%	26.9%	6.1%	8.6%
City Bus				8.2%	3.1%	8.6%	8.6%
Bicycle				2.2%	0.8%	11.4%	8.1%
Tram						11.4%	4.7%
Car (accompanied)				10.2%	5.7%	1.1%	3.0%
Subway					4.9%		3.4%
City Bus	City Bus			1.4%	0.9%	0.2%	3.1%
City Bus	Walk			2.0%	0.3%	1.3%	2.0%
Walk	City Bus	Walk		3.5%	6.1%	1.5%	8.5%
Intercity Bus				0.1%	2.2%		1.3%
Car (alone)	Train	City Bus		0.2%			1.1%
Train	Train			0.1%	0.4%		1.0%
Tram	Tram				0.1%	3.2%	0.9%
Train	Walk			0.1%	0.1%	0.2%	1.0%
Walk	City Bus			1.2%	0.5%		0.9%
Car (alone)	Walk			1.7%		0.2%	0.9%
Car (alone)	Train	Walk		0.4%			0.9%
Subway	Walk				1.2%		0.9%
Train				0.4%	0.4%		0.8%
Tram	Walk					4.6%	0.7%
City Bus	Tram					1.1%	0.8%
Motorbike				0.7%	0.7%	0.4%	0.6%
Train	City Bus			0.4%			0.7%
Car (alone)	Train	Subway			0.5%		0.6%
Intercity Bus	Walk			0.2%	0.7%		0.6%
City Bus	Subway				0.3%		0.6%
Subway	City Bus				0.7%		0.6%
Intercity Bus	Intercity Bus			0.1%	0.8%		0.5%
Walk	Subway				1.0%		0.4%
Car (accompanied)	Train	City Bus		0.2%			0.5%
Tram	City Bus					0.8%	0.4%
Car (alone)	Train	Subway	Walk				0.4%
Walk	Train	Subway			0.3%		0.4%
Walk	Train	City Bus		0.1%			0.4%
E-bike				1.3%	0.7%	4.4%	0.2%
Car (accompanied)	Train	Walk					0.4%
Intercity Bus	City Bus			0.5%	0.4%		0.3%
E-Scooter				0.2%		1.3%	0.3%
Car (alone)	Subway				0.4%		0.3%
Walk	Tram					0.8%	0.3%
Car (alone)	Subway	Walk			0.1%		0.3%
City Bus	Subway	City Bus					0.3%
Subway	Subway				6.2%		
Car (accompanied)	Walk			0.8%	0.1%		0.3%
Car (alone)	Train	Tram				0.2%	0.3%
Subway	Tram						0.3%
Walk	City Bus	Subway			0.9%		0.3%
Car (alone)	Subway	City Bus					0.3%
City Bus	Subway	Walk					0.3%
Train	Subway				1.2%		0.2%
Car (alone)	Train	City Bus	Walk				0.3%
Tram	Subway				0.1%		0.2%
Car (alone)	City Bus			0.7%			0.2%
Car (accompanied)	Train	Subway					0.2%
Walk	Subway	Walk			0.4%		0.2%
Walk	Train	Walk			0.1%		0.2%
Train	City Bus	Walk		0.1%			0.2%
Car (accompanied)	Train	Subway	Walk				0.2%
Walk	Train	Subway	Walk		0.1%		0.2%
Train	Subway	Walk					0.2%
Intercity Bus	Tram						0.2%
Walk	Subway	City Bus			0.5%		0.2%
Intercity Bus	Subway				1.3%		0.1%





Lastly, we try to briefly assess the main issue regarding modal share as determined by *real* choices and not budget constraints, as previously discussed in Par. 5. In other words, the question could be expressed like this: *is cycling a “poor people alternative” to using a car when the latter cannot be afforded?* Table 6.6 addresses this issue by comparing the (full, both unimodal and multimodal) cycling share between those who have a car available for commuting and those who do not have it. If a substitution effect was in action, we should observe a systematically higher share of cycling among those not having access to a car for the commuting; this is actually the case only for Coimbra, but in the three other cities figures are instead similar - and even in reverse order of magnitude for Madrid and Montpellier. A more in-depth analysis could be performed, but at first glance, therefore, the answer to the above question is negative.

Table 6.6 - Cycling to university by car availability - Survey 1

	Coimbra		Madrid		Montpellier		Torino	
	No car	Car available	No car	Car available	No car	Car available	No car	Car available
Cycling	5.0%	2.4%	2.9%	3.3%	11.0%	13.6%	10.4%	8.0%
No Cycling	95.0%	97.6%	97.1%	96.7%	89.0%	86.4%	89.6%	92.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

7. Motivations and perceptions

A small section of Survey 1 was devoted to explore the subjective perceptions that inspired or motivated people to make certain decisions about active mobility adoption/non adoption. For example, non-users of active mobility were invited to select the main reasons for this choice among a pre-made list of ten items, resulting in the distribution depicted in Table 7.1.

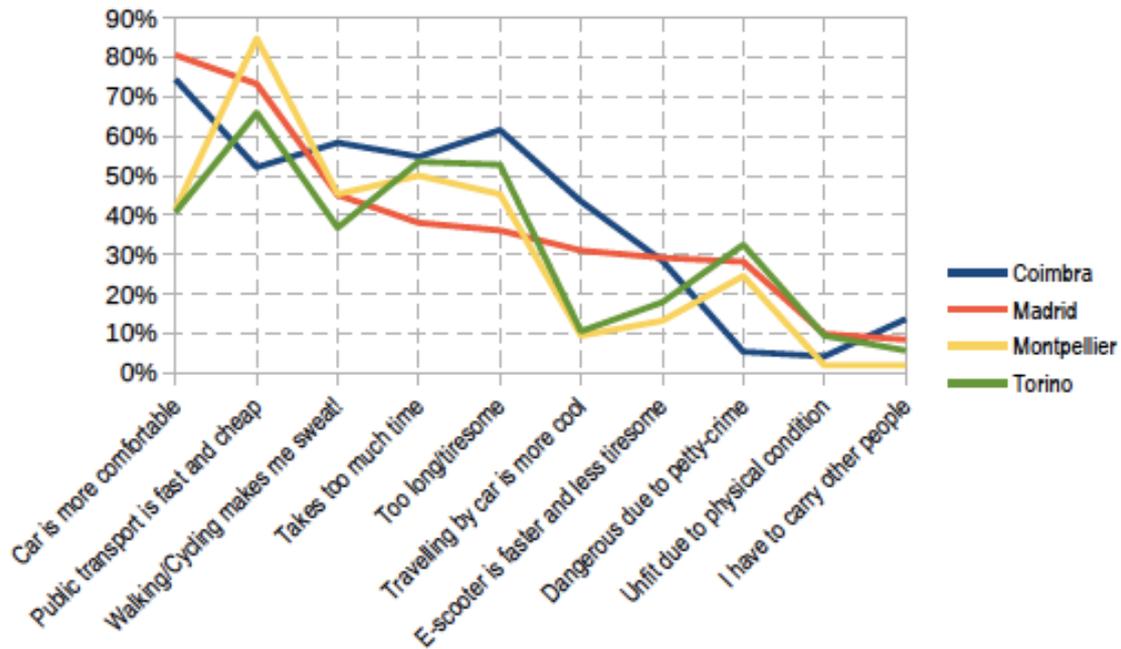
The comfort that a car should provide is the top reason in Madrid and Coimbra (over 80% of the Spanish sample agree on that), while it keeps only half such importance in Montpellier and Torino. Of course, it could be noted that you need the “comfort” of a car just because traffic is chaotic and dangerous due to having too many cars around... so this looks very much like a vicious circle.

If comfort is widely considered the most important positive factor about cars, what follows in the list are the perceived advantages of public transport: namely, affordability and speed. These can vary significantly from place to place, but they look at their best in Montpellier, where they motivate nothing less than 85% of those not using active mobility. Madrid public transport is a close second on this too (73%). However, the same figure drops down too little more than 50% in Coimbra. Having noted the perceived comparative advantages of the main modal alternatives, what follows are the (perceived) difficulties of active mobility in itself: physical effort causes excessive perspiration; it is slower and exhausting. These three items get about 50% of the votes everywhere, with predictably the highest rate in Coimbra (the hilliest of the four). The position of Coimbra is a bit critical as well on the issue of the car being “cool”: there is still a surprising 40% that has such a feeling, while in Torino and Montpellier it is just a small ten percent.





Figure 7.1 - Factors discouraging active mobility - Survey 1



Next, the same subgroup was asked to evaluate the importance of a series of factors in pushing people to shift their modal habits towards active mobility. This time the response was not just a bivariate Yes/No, since the question entailed the choice of a level of importance/urgency for each item. To obtain a synthesis similar to the previous one here it will be necessary to convert the Likert ordered scale of importance assigning numerical values:

- Totally unimportant 0
- Not important 1
- Quite important 2
- Very important 3

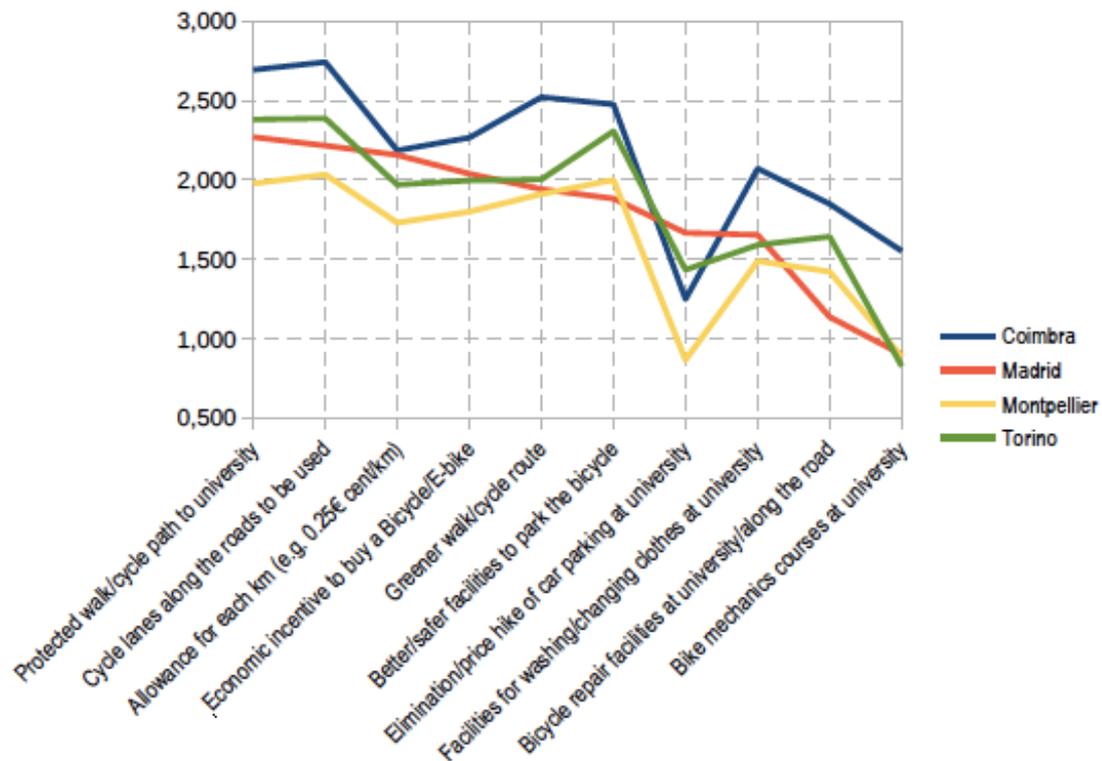
So, as to be able to compute averages. With this preparation, Figure 7.2 shows what would constitute the better incentive to cycling in the four academic communities. A first general observation is that Coimbra seems more interested to all incentives that people from the other city, while Montpellier, at the opposite extreme has a generally lower curve. This could indicate that, in general, Portuguese in the sample are more in need of incentives to make switch to bike mobility.

Regarding instead the relative position of the single items submitted, people everywhere look out for solid, infrastructural improvements first: protected cycle paths, but also cycle lanes, with due importance also to the “greener” routes (especially in Coimbra); immediately after those, the tangible, personal economic incentives both in the shape of initial bonuses for the purchase, as well as the small contributions linked to the length of the routes done by bicycle.





Figure 7.2 - Importance of possible incentives to cycling - Survey 1



8. Active mobility and lifestyle apart from university

As the *Cycling, Campus and City* project aims to raise the awareness about active mobility being a coherent part of a healthy general lifestyle, the survey perspective was extended beyond the sole commuting to and from university, to get indications about how often walking and cycling were used for other daily endeavours and for leisure/fitness/sport. Moreover, a final question allowed to check if other fitness/sport activities - apart from mobility - were also practised.

Table 8.1 summarises details about the use of active mobility in daily endeavours (excluding the university commuting). This could include any short or long journey like shopping, visit friends and relatives, going out in the evening, performing other chores like medical visits, etc.

Data regarding walk, cycling and using e-bikes are put side by side to facilitate the comparison. To ease the comparison, the items *Never*, etc. were replaced with arbitrary percentage values, i.e. *Never* = 0, *Rarely* = 25%, *About half* = 50%, *Most of the time* = 75% and *Always* = 100%. to compute the corresponding averages, shown in Table 8.2. Notice that such figures, while allowing a concise view, can derive from very diverse situations: a value of, say, 50% for cycling could imply that everybody goes around cycling half the times they are moving or, at the other extreme, it could also mean that half of the sample *always* moves by bike, and the other half *never* uses a bicycle. Only examining the distributions in Table 8.1 things can be precisely diagnosed.

In any case, it is clear that walking around for all other activities apart from commuting to university is very common, as the average percentage of such mobility is done in this way hovers around 60% everywhere. Cycling is expectedly less used, but some interesting features surface, as for example the large values for Madrid, for normal as well





as electric assisted bicycles (the latter being more than double than for all other cities): this could be ascribed to the fact that in such a large city most of the daily necessities/amenities can be pursued locally, in the neighbourhood, while your campus will most often be far away, making you less prone to reach it by bike.

Table 8.1 - During all your other endeavors, how frequently do you move... - Survey 1

... on foot?	Coimbra	Madrid	Montpellier	Torino
Never	7.3%	5.2%	1.1%	2.3%
Rarely	20.5%	14.9%	18.1%	20.0%
About half of the times	20.4%	23.9%	31.9%	31.8%
Most of the time	23.3%	45.1%	39.9%	36.2%
I always move on foot!	28.4%	10.9%	9.0%	9.7%
Total	100.0%	100.0%	100.0%	100.0%
... by bicycle?	Coimbra	Madrid	Montpellier	Torino
Never	77.5%	41.3%	64.1%	52.8%
Rarely	16.9%	41.3%	19.6%	27.2%
About half of the times	2.8%	13.3%	6.8%	9.3%
Most of the time	2.0%	3.0%	6.6%	6.7%
I always move by bicycle!	0.8%	1.0%	2.9%	4.0%
Total	100.0%	100.0%	100.0%	100.0%
... by e-bike?	Coimbra	Madrid	Montpellier	Torino
Never	91.3%	73.0%	93.0%	89.3%
Rarely	5.2%	18.4%	2.6%	7.6%
About half of the times	1.9%	5.0%	2.2%	2.4%
I always move with the e-bike!	1.1%	1.0%	0.4%	0.0%
Most of the time	0.4%	2.6%	1.8%	0.7%
Total	100.0%	100.0%	100.0%	100.0%

Table 8.2 - Average percentages of daily endeavours done by active mobility - Survey 1

	Coimbra	Madrid	Montpellier	Torino
On foot	61.3%	60.4%	59.4%	57.8%
By bicycle	7.9%	20.2%	16.1%	20.5%
By e-bike	3.5%	10.4%	3.9%	3.8%

It is also possible to examine the *connection* that exists between the two similar types of behaviour, in other words answering the question: *do people commuting to university in a certain mode tend to use that same mode for their mobility to other destinations?* To obtain some hints on this in an easy, standard way, the use of the bicycle for other endeavors and for commuting were cross-tabulated associating numerical values as in Table 8.2 to the first item and transforming the second into a dummy (0: does not use a bicycle for university commuting, 1: uses it). On these bivariate distributions correlation coefficients were computed, with values close to one implying a positive answer to the above question, values near zero meaning that the choices appear to be uncorrelated, and values close to -1 that most people can cycle significantly but typically do not combine the two types. For cycling, this results in a quite strong a correlation for Montpellier (0.66) and also Torino (0.61), while values are lower for Coimbra (0.48) and especially Madrid (0.31). This clearly confirms the first impression coming from Table 8.2: The correlation in the latter is relatively low because Some people cycle quite frequently in their neighbourhood, but not when travelling around the city as a whole.





Given this exception, it can be affirmed that in most cases people who cycle tend to “cyclists” in the sense that they consider that mode as a normal, everyday choice for their mobility.

We now move to the third - and last - approach to active mobility: the one that relates directly to personal well-being rather than the need to reach some destinations. In other words, you move actively engaging your body explicitly for leisure, fitness or sports.

Madrid stands out again on walking, as its community has a stronger habit of walking for leisure/fitness than the other three cities: if we consider regular joggers (i.e., those practising it more than just once a week) they are the majority (55.3%) in Madrid only; the behaviour is rather similar in all the other cases, with more than one third of the sample never going for a walk.

Moving to cycling, percentages are generally lower, with around 70–80% non-practitioners; strangely enough, the highest of such values (85.5%) for Montpellier, even though this is the city with the strongest bicycle modal share in commuting. Here Torino and Madrid are the strongest performers, showing again a contrast with the low associated modal commuting share for the Spanish Capital.

Table 8.3 - Active mobility for leisure/sport - Survey 1

<i>Do you walk/jog for leisure as well, and how often?</i>	Coimbra	Madrid	Montpellier	Torino
Never or only rarely	39.6%	21.7%	42.2%	38.0%
Once a week	26.3%	22.9%	23.8%	24.9%
Two-three times a week	22.3%	37.3%	22.5%	24.5%
Almost everyday	11.8%	18.0%	11.5%	12.7%
Average weekly frequency	1.412	2.064	1.375	1.494
<i>Do you cycle for leisure as well, and how often?</i>	Coimbra	Madrid	Montpellier	Torino
Never or only rarely	80.7%	69.7%	85.5%	77.0%
Once a week	14.8%	19.3%	7.7%	12.0%
Two-three times a week	3.7%	10.0%	4.4%	6.8%
Almost everyday	0.8%	1.0%	2.4%	4.3%
Average weekly frequency	0.279	0.494	0.308	0.504
<i>Do you ride an e-bike for leisure as well, and how often?</i>	Coimbra	Madrid	Montpellier	Torino
Never or only rarely	96.2%	89.1%	96.9%	95.0%
Once a week	2.4%	6.0%	2.0%	2.7%
Two-three times a week	1.1%	3.9%	1.1%	1.8%
Almost everyday	0.3%	1.0%	0.0%	0.5%
Average weekly frequency	0.066	0.207	0.047	0.097

Finally, the outcome for e-bikes, which is strongly dependent on the actual possession of this (more expensive) kind of vehicles, puts again Madrid under the spotlight as this city is the only one that has more than 10% of practitioners as well as 5% of regulars.

Concerning the last question of this questionnaire section, i.e., possible practice of other sport/fitness disciplines, responses are showcased in Table 8.4.

Again, we find Madrid at the top, with more than a quarter of the sample doing sport *almost every day*, and a whopping 64.5% practising frequently and regularly (more than one a week).

In the end, we try to have a comprehensive evaluation of the question “*Is there a profile of active, healthy people in universities that combine everyday active mobility with*





sport/fitness practice in a virtuous combination?”, a profile whose promotion is one the goals of the 3Cs project.

Of course, this a complex answer that deserves further enquiry, and the indications that we can try to propose here are certainly not conclusive. In the field of mobility, we did observe almost everywhere a significant correlation between choosing active mobility both for commuting and all other necessary travel - especially for Montpellier and Torino, less for Coimbra and Madrid. This happens again - even though with a slightly lesser strength - when we consider the correlation between active mobility used in commuting and for leisure/fitness (correlations are 0.5 and 0.42 for Torino and Montpellier respectively).

Table 8.4 - Practice of other sport/fitness activities - Survey 1

<i>Do you regularly practice physical activity/sports other than walking/jogging or cycling?</i>	Coimbra	Madrid	Montpellier	Torino
Never or only rarely	36.9%	18.5%	39.1%	32.7%
Once a week	18.4%	17.0%	22.5%	21.3%
Two-three times a week	27.8%	37.7%	27.4%	34.0%
Almost everyday	17.0%	26.8%	11.0%	12.0%
Total	100.0%	100.0%	100.0%	100.0%
Averages	1.727	2.452	1.461	1.664

However, intersecting active mobility for commuting with other sporting pursuits as described in Table 8.4, the link vanishes, with correlation coefficients always lower than 0.1; therefore the “perfect healthy lifestyle” profile is not prevalent, despite the fact that regarding mobility there is a certain consistency of choices; this however is not systematically coupled with other healthy physical undertakings.

9. The MUV tournament and Survey 2

As briefly explained in Par. 2, the second survey (Survey 2 from now on) was explicitly linked to the MUV tournament that was organised in the winter 2024-25 and activated in the spring of 2025. This time the target populations were not the whole university communities in the four cities, but rather the “active movers” only, i.e., people that were at least loosely connected with the 3Cs project⁴. Before delving into the goals and results of Survey 2, the present paragraph describes the main features of the MUV app and the Tournament that put the four universities in direct competition on active mobility.

Within the context of the 3Cs project MUV Game played a crucial role in actively engaging university communities from the four European academic institutions in promoting sustainable mobility. The main objective was to encourage students, professors, and university staff to adopt ecological means of transport, with a specific focus on active mobility, for home-university journeys through an innovative approach based on gamification.

MUV Game is a gamification and data analysis platform designed to actively engage any group of people by making the adoption of sustainable mobility habits fun and measurable. The CO₂ emissions calculation algorithm is validated according to the ISO14064-2 standard, ensuring data reliability. The platform has demonstrated its

⁴ While the tournament was in progress, to increase the sample size, it was decided to extend the reference population to all active movers willing to take part in the survey. In the questionnaire, the section regarding the engagement through MUV was obviously reserved to the players.





effectiveness with an average 32% reduction in CO₂ emissions per active user during competitions.

The operation is based on three simple actions the users activate on their mobile phones: PLAY (travel mode selection), SWITCH (mode change during the journey), and STOP (arrival at destination). This basic mechanism allows the development of game dynamics through competitive challenges, collaborative challenges, and team tournaments. Figure 9.1 shows the main interface of the MUV app.

Figure 9.1 - User interface of the MUV app - the screen while playing



In this case, MUV set up a “Tournament”, i.e., a competition where different teams (representing the four universities) try to record on the app as many journeys done with active mobility as possible, during a predefined period of time. The app can record any kind of mobility that could be considered somehow sustainable (public transport, sharing, car-pooling); however, in this case the only modes that allocated points to the competitors were those considered “active”, i.e., walking, cycling and e-biking. Overall, the project involved 1612 registered users, with 1005 active users who actually participated in the activities.

The MUV platform combined the mobile app with a powerful dashboard that give evidence of all data that are recorded during the competitions, down to the single journey route as indicated by the GPS tracking. Figure 9.2 displays comparatively the main results of the tournament regarding participation and sustainability.

Of course, the competition is based on the accumulation of points awarded to each team anytime a member moves in an active way. Since teams can have different sizes but this should not influence their ranking, the total score of each team is determined by an algorithm that takes into account the best ten players and the average point of all other players. In this way, any team with ten or more active player can compete on an equal basis regardless of the team size.





Moreover, the structure of the game is organised so as to stimulate players with a succession of weekly stages, that involve direct challenges between each couple of teams, declaring a winner at the end of each week. The “final battle” between the teams that have won the previous weeks matches concludes the tournament in the last week.

In the present case, it culminated with the University of Turin's victory in a very vibrant final match against Coimbra.

A fundamental aspect of the project was the web dashboard provided by MUV, which proved to be an essential analysis tool for the universities. Through this platform, institutions were able to monitor the progress of competitions in real-time and gain comprehensive insights into their community's active mobility patterns.

Figure 9.2 - Comparative results of the tournament - MUV dashboard



The dashboard enabled universities to track key metrics such as user engagement, distance covered, CO₂ savings, and participation trends over time. At the end of the tournament, this tool provided a clear and precise overview of how students moved to and from the various campuses throughout the initiative.

The analytical capabilities of the dashboard allowed universities to identify peak activity periods, understand mobility flows within their territories, and assess the effectiveness of their sustainable mobility promotion strategies. This data-driven approach is a precious asset contributing to future planning and policy development regarding campus mobility.

Since MUV was already user within the 3Cs project in a previous game in early autumn 2024, it is also possible to compare the engagement and check the possible growth of the involved groups. Comparing data from October 2024 to May 2025, significant increases were recorded; Figure 9.3 documents the variations occurred.

The mapping functionality that MUV provides within its dashboard were expressly improved and refined for the 3Cs project. One of the most important new features allows the authorized user to select for the geographical representation the routes that have the same origin or destination. This allowed to easily and clearly focus on the routes of





travellers headed to each involved campus, so as to identify the most covered routes to the campus or university location under scrutiny.

In practice, an extensive coverage of urban territories around each university was revealed. Not only the visualisation of trips showed how the initiative effectively influenced daily mobility behaviours; the tools available in the dashboard allowed to identify all the streets and intersections that needed to be examined in the “Route Study” to list all the improvements and infrastructural modifications needed to make active mobility along the most covered routes safe, easy and comfortable.

Figure 9.3 - MUV teams’ evolution from 2024 to 2025 - MUV dashboard

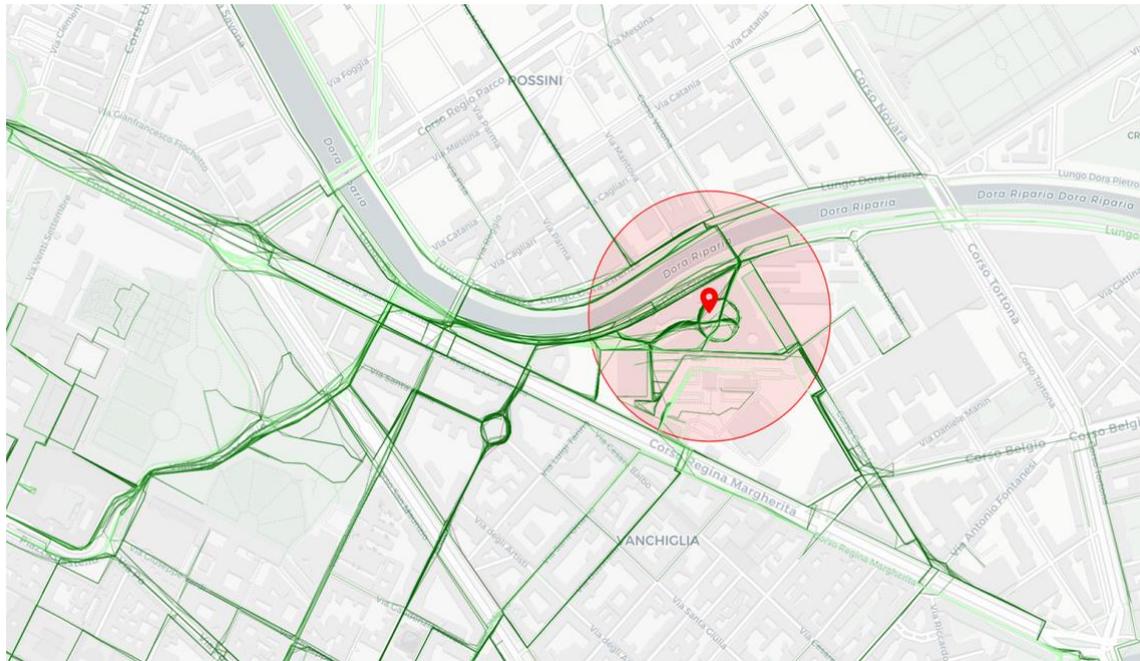


Each university's map displayed unique patterns reflecting local geography and transportation infrastructure, providing valuable insights into how different urban contexts influence sustainable mobility adoption. Figure 9.4 shows an example of MUV filtered maps, with the whole set of recorded routes with origin or destination lying in a 200 mt. wide circle encompassing one of the main campuses of the University of Torino.





Figure 9.4 - MUV dashboard maps - showing all active routes with O/D in the circle



10. The response rates and sample composition in Survey 2

Given the different approach with which Survey 2 was conducted, the sample size is of course different: in all some 1405 responses were collected, with 1204 of them that are fully informative, while the remaining 201 do contain only partial information, as the respondents preferred to stop filling the questionnaire before its end. They will be kept anyway, so as to exploit all information available when it is available.

The distribution of the sample across the four universities is uneven, but again the very different size of their communities justifies in large part such discrepancies, as shown in Table 10.1, where also the sizes of the respective MUV player teams are reported.

Table 10.1 - Sample size, response rate and MUV team size by university - Survey 2

	Sample size	Response rate	Subscribers to MUV
Coimbra	205	0.60%	424
Madrid	24	0.50%	275
Montpellier	65	0.28%	218
Torino	1111	1.47%	695

Notice that the response rates presented here are not realistic, since - as noted before - the target population here are only the active movers, a grup obviously much smaller than the whole academic community. Of course, Survey 1 can give us some hints about this; for instance, Coimbra and Madrid have smaller shares of active mobility, so their response rates against the actual target population could be considered higher. Montpellier is in a different position, as active mobility has a good modal share. In fact, Montpellier low turnout for this survey is attributable to its timing schedule being overlapped with that of another official survey, that prevented the 3Cs team from promoting Survey 2 on university information channels.





Also, since Survey 1 was not that distant in the past, Survey 2 was designed to be simpler, going straight to the core issue of active mobility and MUV. The questionnaire was divided in three main sections: one concerning walking, one on cycling, and one on the MUV game as a tool for raising awareness on sustainable mobility. Trying to impose a very light burden on the respondent, each individual had to fill just one of the two modal sections: a walker only would fill only the walker section, a cyclist only the cycling section; anyone who was both would end up completing the cyclist section only, given the stronger interest for cycling promotion in the project. Finally, the MUV section was of course submitted only to MUV subscribers.

Gender of participants are similar to those obtained for Survey 1 in Torino and Madrid, while in Montpellier and even more in Coimbra males appear to be now prevalent, with the caveat that the small sample size for Montpellier makes the estimate hardly reliable.

Table 10.2 - Gender of respondents - Survey 2

	Coimbra	Madrid	Montpellier	Torino
Female	32.7%	65.0%	46.9%	64.8%
Male	66.1%	35.0%	53.1%	32.9%
Not binary	1.2%	0.0%	0.0%	2.3%
<i>Total</i>	<i>100.0%</i>	<i>100.0%</i>	<i>100.0%</i>	<i>100.0%</i>

The other information that can be compared is the role in the academic community, as in Table 10.3. Again, some figures appear clearly not representative of the community subdivision: in all cases except Torino there is a significant over representation of the staff (including teaching and technical administrative personnel) over the students; this is commonplace in such surveys, as working people tend to be more responsive to invitations to do something which is optional from their superiors/peers than students; it was present in Survey 1 as well, albeit less strongly. Here the data management strategy will differ in that we will not enable a weighting system that, with some samples at such small sizes, would be unreliable. Only the distinction between the four cities will be maintained.

Table 10.3 - Roles of respondents in the academic community - Survey 2

I am a...	Coimbra	Madrid	Montpellier	Torino
Bachelor/Master/PhD Student	66.8%	50.0%	58.5%	80.8%
Professor/researcher	2.4%	33.3%	4.6%	2.0%
Technical/administrative staff	12.2%	0.0%	12.3%	4.1%
Other personnel	2.0%	0.0%	0.0%	0.4%
<i>Total</i>	<i>100.0%</i>	<i>100.0%</i>	<i>100.0%</i>	<i>100.0%</i>

Another important piece of information that was not present in Survey 1 is the participation to MUV: while it is true that Survey 2 was conceived as closely connected with the spring MUV challenge, invitation to fill the questionnaire was extended to all active movers. Table 10.4 proves in fact that, while a significant part of the sample did join the MUV event, many other respondents did not, the only exception is Madrid, where the very small sample was composed in the main by the local MUV team (also as commuting cyclists are so few there, the target population was certainly quite small in itself).



**Table 10.4 - Participation to the MUV challenge - Survey 2**

Did you take part to the MUV challenge?	Coimbra	Madrid	Montpellier	Torino
Yes	28.6%	76.2%	26.0%	22.3%
No	71.4%	23.8%	74.0%	77.7%
Total	100.0%	100.0%	100.0%	100.0%

11. The role of active mobility in the modal split

Here also the information collected on the modal share will be simpler and leaner than in Survey 1; all modes except cycling and walking will be mostly aggregated together and no longer distinguished; in multimodal cases, the modes will still be requested by without their order in the journey, and classified only in five macro-categories: walk, bicycle, e-scooter, car/motorcycle, and public transport (the distinction of sharing services turned out to be relevant only for a such a small group that here was omitted).

The focus on modal split starts by asking how is the individual's "mobility time", i.e., the whole time he spends moving and travelling is used to walk, to cycle and to travel in all other modes. Table 11.1 reports the average split; notice that this "whole story" including *any* mobility performed for whatever reason, even leisure, sport etc., and it is expressed in *time*, not distance. This tends to give more importance to slower modes, that cover shorter distances but may take considerable amounts of time, at least if compared with fast travel, like a train or a car on a highway.

For cycling, Torino is now leading with Montpellier a close second, while Coimbra and Madrid lag behind; though Coimbra has a very large share of mobility time spent walking, while Madrid is the only city where other modes prevail (maybe time spent in cars in congested traffic?).

Table 11.1 - Partition of "mobility time" among modes - Survey 2

	Coimbra	Madrid	Montpellier	Torino
Walking	58.1%	41.5%	43.8%	46.0%
Cycling	3.4%	4.0%	14.9%	21.2%
Other modes	38.4%	54.6%	40.3%	32.8%

Survey 2 included also a short question on the characteristics of the commuting route in terms of agreeableness and safety for active mobility. For this, all routes were classified into three types, asking the relative proportion of each type that the individual had to travel towards university. In Table 11.2 the average proportions by city are presented. No city is actually an active mover paradise, though Montpellier fares somewhat better than the rest, with the highest ratio of protected paths and parks. Torino being really close, while the other two lag somewhat behind. In all cities, however, at least a third of the home to university routes are on average on heavy traffic roads, something that clearly hinders further adoption of active mobility in commuting.

Table 11.2 - Modal combinations for university commuting - Survey 2

	Coimbra	Madrid	Montpellier	Torino
Protected cycle paths and/or traffic-free parks/gardens	15.1%	14.8%	26.3%	23.3%
Quiet, low traffic streets/roads	39.3%	45.3%	41.5%	34.5%





Heavy traffic, dangerous streets/roads	45.1%	40.0%	34.5%	42.2%
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The specific journey to university is also considered by itself, although in a simplified fashion. Again, multimodality is relevant, as Table 11.3 demonstrates, particularly in the largest cities, culminating in Madrid, the only location where unimodal commuters are not only a minority, but actually just a quarter of the sample.

Table 11.3 - Number of mobility modes in home to university commuting - Survey 2

n. modes	Coimbra	Madrid	Montpellier	Torino
1	55.9%	25.0%	58.5%	42.4%
2	34.3%	58.3%	35.4%	45.3%
3	9.3%	16.7%	6.2%	11.8%
4	0.0%	0.0%	0.0%	0.5%
5	0.5%	0.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%	100.0%

The following Table 11.4 displays all modal combinations used in full detail. Notice that these results cannot be compared to those in Tables 6.4 and 6.5, since here only active mobility users were sample. This is easily seen through the very low car shares (which are not zero since some respondent could adopt active mobility for other endeavours, but not the university commuting). In fact, you we add walking, cycling and the multimodal combination of walk plus public transport we have the majority in all cities.

Table 11.4 - Modal combinations for university commuting - Survey 2

	Coimbra	Madrid	Montpellier	Torino
Walk + Public transport	15.7%	50.0%	26.2%	30.7%
Bike	0.5%		15.4%	16.5%
Walk	31.9%	8.3%	27.7%	16.2%
Public transport	5.4%	16.7%	9.2%	7.2%
Walk + Bike + Public transport	0.5%	4.2%	4.6%	6.4%
Walk + Bike	2.0%		3.1%	5.9%
Walk + Car + Public transport	7.4%	12.5%	1.5%	4.3%
Bike + Public transport	0.5%		1.5%	4.1%
Car	16.7%		6.2%	2.4%
Walk + Car	11.8%	4.2%	1.5%	1.9%
Car + Public transport	3.9%	4.2%	1.5%	1.6%
Bike + Car	0.5%			0.5%
Walk + Bike + Car	0.5%			0.4%
Walk + E-scooter + Public transport				0.4%
Bike + E-scooter				0.3%
Walk + E-scooter			1.5%	0.3%
Walk + Bike + E-scooter + Public transport				0.3%





Bike + Car + Public transport		0.2%
Walk + Bike + Car + Public transport		0.2%
Walk + Bike + E-scooter		0.2%
E-scooter	1.5%	0.1%
E-scooter + Public transport		0.1%
E-scooter + Car		0.1%
Walk + E-scooter + Car	1.0%	
Walk + Bike + E-scooter + Car + Public transport	0.5%	

12. All about walking

To thoroughly study the habits and choices of active movers, they were divided into walker and cyclists - but of course many people actually fit into both categories. Based on the indications on the mobility time spent walking or cycling, all cases where both modes had a role in the modal split were asked to suggest what could be the factors that motivated, for each specific journey, the choice of walking rather than cycling. A significant part of the sample fell into this “mixed active mobility” category, ranging from 20% in Coimbra all the way up to 52% for Torino. Table 12.1 gives the frequency, among those with mixed active mobility, with which some suggested factors would induce people to walk or cycle⁵.

Almost all factors suggested turned out to be quite relevant, starting from the most obvious (cycling is for longer distances; walking is preferable if it rains - this is more common in Torino, likely to be a rainier location than the others) but also, with percentages which are not that small, factor like using the bicycle for fitness and safety from bicycle theft. Rational motivating factors can be also not existing - at least a third of the group everywhere is stating that the choice can just depend on what you do feel like doing at the moment.

Table 12.1 - Factors motivating the choice between walking and cycling - Survey 2

Factor	Coimbra	Madrid	Montpellier	Torino
I walk for short distances and cycle for longer trips	39.0%	20.0%	51.9%	52.7%
I walk when it's cold/rainy and cycle when the weather is good	17.1%	20.0%	25.9%	47.1%
It just depends on the spur of the moment!	41.5%	40.0%	33.3%	34.1%
I walk when I am with friends and cycle when I am alone	14.6%	40.0%	11.1%	29.5%
I cycle when I'm on a hurry, walk otherwise	14.6%	0.0%	48.1%	27.4%
I cycle when I can park the bike safely at the destination, walk otherwise	17.1%	0.0%	25.9%	26.0%
I cycle for sports and fitness, and walk when going around the city	31.7%	40.0%	25.9%	18.2%
I cycle to go to university and walk for other endeavours	9.8%	20.0%	11.1%	16.6%
I walk if I have to climb and cycle when the route is flat	0.0%	0.0%	7.4%	7.1%

⁵ Madrid has only *five* cases of mixed active mobility, so the percentages in Table 12.1 for that city have a really low reliability level.





Walkers were also asked to indicate the maximum distances that they were willing to cover on foot, distinguishing whether they walked to go places, or to do fitness/jogging. The average responses can be found in Table 12.2. Truly, all mean values appear quite large, but it is appropriate to remind that this a sample of active movers, and these values refer to the subgroup that walks more. As in other instances, largest cities enjoy longer distances, as if the size of the city would affect the willingness to walk more. Predictably, average distances for fitness activities are a bit higher in some cases, especially for Coimbra and Montpellier, but with more heterogeneity around the mean (larger Standard deviation values).

Table 12.2 - Average maximum acceptable distances when walking (km.) - Survey 2

City	Max distance going places		Max distance doing jogging/fitness exercise	
	Mean	St. Deviation	Mean	St. Deviation
Coimbra	3.8	3.13	8.0	9.28
Madrid	5.5	4.49	5.0	5.48
Montpellier	3.9	2.53	7.0	6.48
Torino	4.6	4.08	6.8	8.45

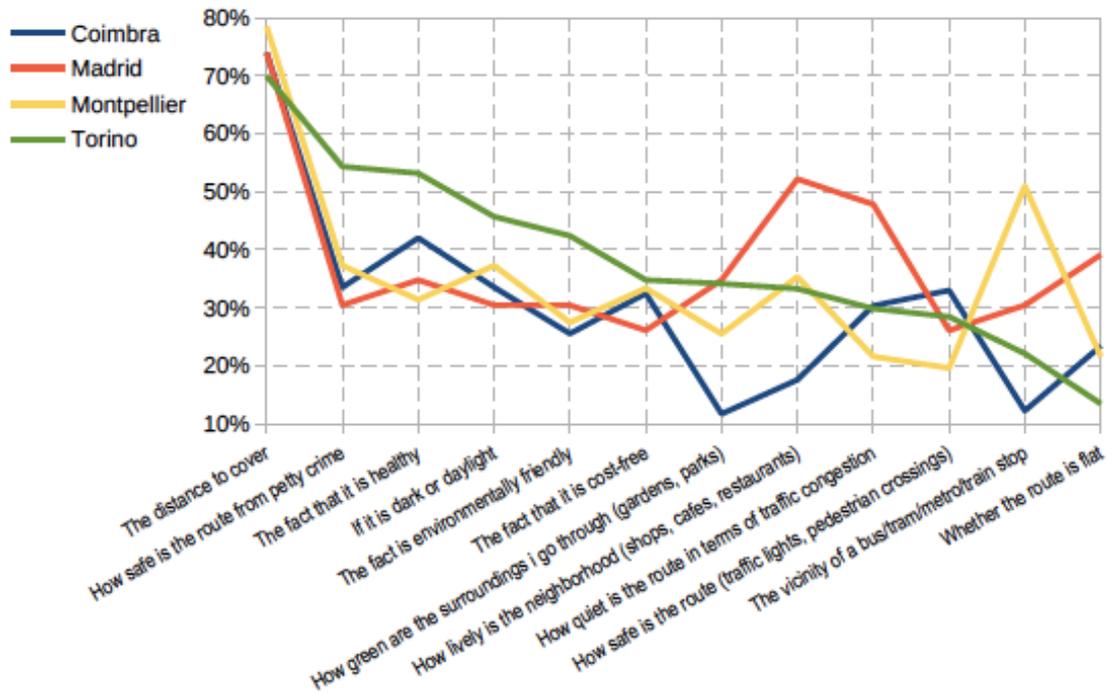
In the end, what are the factors that people tend to consider when they decide to walk instead of using other, obviously faster, modes to move around? We submitted directly to walkers a series of possible items to check what was considered important in this context. The question was stated precisely as “Does your decision to walk when going somewhere depend on...” followed by each of the items showed in Figure 12.1.

As obvious, the distance is a key factor everywhere: to walk is nice, but you do not want to definitely waste time and too much effort in it; in all cities at least 70% of the sample agreed on this. Most of the other factors showcase instead some differences in opinions (in the graph items are listed in order of decreasing importance as seen in Torino, i.e., the largest group in the sample). For example, safety (the risks of petty crime along the streets, the desire to avoid walking in the dark) motivations are considerably important in Torino, with 20 percentage points more there than in the other cities; but the same gap is there for some positive factors, like the fact that walking constitutes a healthy exercise. While the other three cities display similar ratios around 35 for those issues, opinions disagree on other matters: Coimbra has very little consideration for items regarding the quality of the neighbourhood both in terms of the presence of green, parks etc., as well as of shops, cafés and the like. The latter is instead much appreciated by respondents from Madrid, who like also streets with less traffic. They are the only group keen on this aspect, while the safety of intersections and pedestrian crossings is not actually bothering so many people anywhere. Lastly, Montpellier displays more attention to the possibility to continue the journey taking advantage of public transport stops that are close by (this is the second most important item in Montpellier).





Figure 12.1 – Factors affecting the decision to walk - Survey 2



If we divide outings on foot by their purpose, we can compare the weekly frequency for each type and city, Torino and Coimbra have similar values, except the higher frequency of walks for fitness in Coimbra; Madrid and Montpellier display opposing behaviour, for which it is difficult to find reasonable reasons. At least for Madrid it always worth noticing that the sample is truly small and the presence outlier values could be affecting these estimates.

Another important topic about which Survey 2 wanted to investigate people perception and awareness was that of the well-being that could directly derive from physical activity, even if not it is not actual sport activity, like walking. The question in Table 12.4 submitted four different statements on this issue, that were agreed upon by the percentages of the sample shown here.

Globally, awareness seems to be quite high, with many items being agreed upon by the majority. People from Madrid are the most sensitive on the issue, but also Torino and Montpellier have very large shares of respondents that feel better in a general sense, even mentally.

Table 12.3 – Average number of walks in a week by type of outing - Survey 2

	Coimbra	Madrid	Montpellier	Torino
Approximately, how often you go shopping on foot in a week?	2.91	9.06	1.28	2.96
Approximately, how often per week do you run errands or go to public offices (e.g., post office, registry office, etc.)?	3.04	9.75	1.50	2.79
Approximately, how often you go to visit friends/cinema/theatre/disco/etc. on foot in a week?	3.65	6.00	2.09	2.87





Approximately, how often you do jogging/fitness exercise on foot in a week?	5.05	3.43	2.12	3.15
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Table 12.4 - Do you feel you get clear, perceivable health benefits from your walking activity? - Survey 2

	Coimbra	Madrid	Montpellier	Torino
I feel more satisfied psychologically when I walk than when I move around by car or other sedentary means	47.3%	52.2%	56.9%	70.9%
I have stronger leg muscles	37.8%	52.2%	37.3%	34.9%
I feel less tired when doing any physical efforts	36.2%	60.9%	27.5%	34.1%
I breathe more easily	25.5%	39.1%	23.5%	22.7%
It's just a feeling of general well being	50.0%	43.5%	66.7%	64.6%

As a final tool for the evaluation of the context where people have the habit of walking significantly, we submitted a series of item that can characterise an urban environment as “pedestrian friendly”. This is clearly useful to directly identify actions and policies that could contribute to a better “walkable city”. All proposed statements began with the clause “Do you feel that walkways in your university city...” to which different features followed in each statement. To allow a detailed analysis we provide both Table 12.5, reporting the statements in full, as well as Figure 12.2, allowing a quicker overview of the situation.

Table 12.5 - Do you feel that walkways in your university city... - Survey 2

	Coimbra	Madrid	Montpellier	Torino
have well maintained surfaces	11.7%	13.0%	19.6%	47.0%
are sufficiently wide	32.4%	34.8%	11.8%	27.7%
<i>are not properly maintained, with dirt and litter</i>	10.6%	13.0%	19.6%	24.7%
are free from obstruction by parked cars	4.8%	13.0%	7.8%	23.5%
always have well-built slopes for wheelchairs/prams etc.	4.3%	8.7%	0.0%	22.7%
are not too often invaded by e-scooters/bicycles when they are exclusively reserved for pedestrians	5.3%	13.0%	3.9%	19.4%
have well organised solutions for crossings/intersections in terms of traffic lights, night time lighting, signals for cars to slow down	10.6%	8.7%	13.7%	17.4%
everything is fine	25.0%	26.1%	41.2%	17.0%

A first look at Figure 12.2 suggests that Torino could be the best city for walkers as most positive statements have more people who selected them. Notice, however, that the only negative statement - highlighted in italics in Table 12.5 - is also more picked in Torino than anywhere else. Also, no positive item obtains a majority making it stand out as a proven quality.

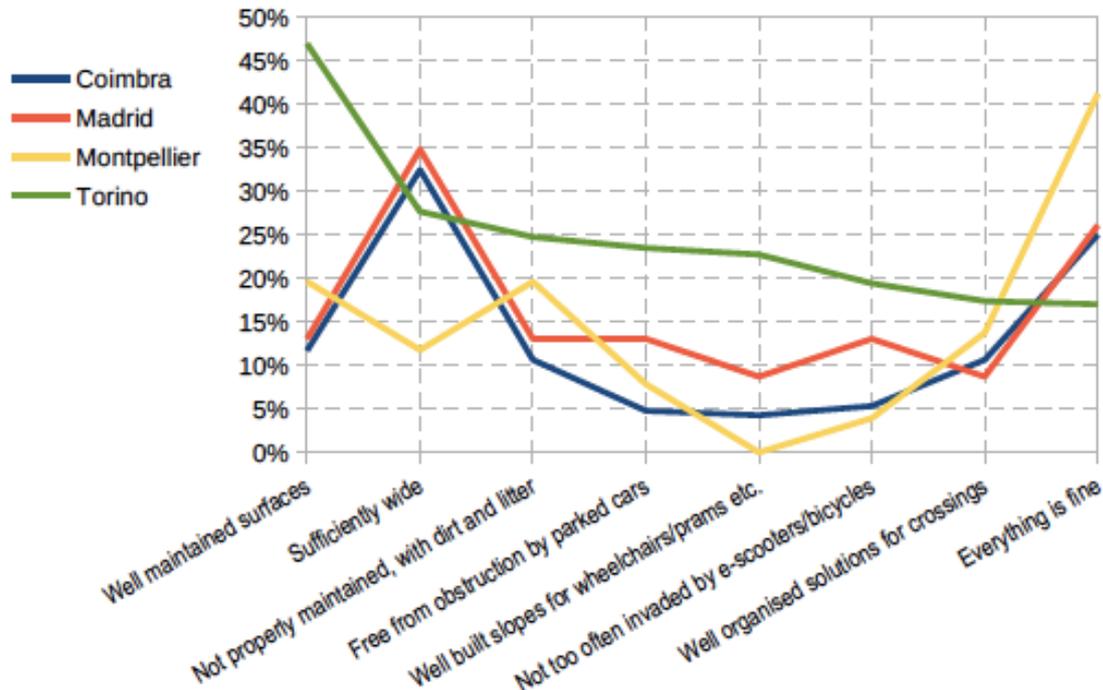
Some items display very low figures in some cities, but each statement has to be treated carefully. For example, the slopes for wheelchairs are of little interest for walkers that have no such need, so that this item could be overlooked by most people. Also, the walkways being free from Scooters and bicycles when they are not conceived for mixed use, but in Coimbra this could be due to the fact that bicycles going around are so few that





the problem cannot exist. In the end, the general statement “everything is fine” if most picked by Montpellier, while Torino has the smallest value for it.

Figure 12.2 - Quality evaluation of urban environment for pedestrians - Survey 2



The quality of the urban environment for active movers is made not only of infrastructures: the behaviour of the other road users is also crucial, since active movers are the more “fragile” road users; and of course, cyclists travel closer to cars, lorries etc. for most of the time, while pedestrians have to interact with them only when crossing streets. A further, last question was then included in Survey 2 questionnaire to check what was the feeling of active movers concerning other drivers’ behaviour. The outcome is reported in Table 12.6, where also the opinion of cyclists on the issue is included, allowing a direct comparison on a question that was almost identically submitted to both sub-groups.

Table 12.6 - Do you think motorist dutifully respect pedestrians right of way in your university city? / Do you think motorists respect and pay care to cyclists as the more vulnerable road users in your university city? - Survey 2

	Coimbra	Madrid	Montpellier	Torino	Cyclists
Sadly, no	25.8%	20.0%	35.7%	37.5%	53.3%
Most do, but too many are still not careful enough	40.5%	40.0%	50.0%	49.4%	42.0%
Yes, apart from very rare exceptions	33.7%	40.0%	14.3%	13.2%	4.7%

Somewhat unexpectedly, Montpellier and Torino seem to be the worst cases with respect to this issue, with very low turnout for the fully positive answer. In any case, the





cyclist’s perception on this is even worse, with more than half of cases where the answer is simply and drastically “No”.

13. All about cycling

Given the relatively limited sample size for Survey 2, with very small number of responses for some cities, the subgroup of cyclist will be treated as a whole, dropping the distinction between the four cities. This is unavoidable, as proceeding as before would result in local distributions based on really just a handful of observations, making them fully unreliable.

What are the maximum distances typically covered by cyclists? The Average in kms. is slightly more than 10 kms. when riding to reach places, do things etc., while this goes up to 39 kms. for rides that have a leisure/sport logic. Using an approach similar to that used for walkers, we submitted a list of statements under the general question “Does your decision to cycle when going somewhere depend on...”, asking respondents to tick all that applied to their own case. Results are reported in Table 13.1, and coupled with the corresponding items submitted to walkers. This comparison allow to spot similarities and differences: the sustainable nature of the choice is much more apparent to cyclists; the same holds true for the safety and quiet of the route. On the contrary petty crime is much more of a problem for walkers than cyclists, as is the case for the agreeableness of the surroundings. Other factor matter to both camps, instead: first of all, the distance to cover, but also the healthy nature of active mobility.

Table 13.1 - Does your decision to cycle when going somewhere depend on... - Survey 2

	Cyclists	Walkers
the distance to cover	70.3%	71.1%
the fact that is environmentally friendly	61.8%	38.4%
how safe is the route in terms of bicycle lanes/paths, intersections, traffic lights	56.8%	28.8%
the fact that it is healthy	51.7%	49.7%
the fact that it is cost-free	48.9%	34.1%
how quiet is the route in terms of traffic congestion	47.9%	29.9%
if it is dark or daylight	25.6%	42.8%
how safe is the route from petty crime	23.3%	49.2%
whether the route is flat	19.9%	16.2%
how green are the surroundings I have to go through (gardens, parks, countryside)	17.7%	29.7%
in the city, how lively is the neighbourhood you go through (shops, cafes and restaurants, other cyclists)	12.0%	31.0%

As respondents are aware of the health benefits of active mobility, let us check in detail the reaction of cyclists to the same aspects of this topic submitted to walkers. Table 13.2 reveals that cyclists are also generally more willing to stress the health benefits of their active mobility, as all percentages are larger for them than for walkers, with the strength of leg muscles enjoying 21 percentages point more for cyclists.

Table 13.2 - Do you feel you get clear. perceivable health benefits from your walking activity? - Survey 2

	Cyclists	Walkers
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I feel more satisfied psychologically when I walk than when I move around by car or other sedentary means	77.3%	65.6%
It's just a feeling of general well being	68.1%	61.6%
I have stronger leg muscles	56.5%	35.9%
I feel less tired when doing any physical efforts	36.0%	34.8%
I breathe more easily	36.0%	23.6%

Further explorations were made for cyclists in Survey 2. First, the exact type of bikes owned were recorded. In Table 13.3 percentages do not sum up to 100, since individuals could own more than one type of bicycle. A small proportion (1.9%) even declared to own no bike at all, so we can assume they are cycling with those available through bike sharing services. Notwithstanding the huge market growth for e-bikes in recent years, their share is still relatively small here; this is linked to the prevalence of students in the academic community, a group that in most cases lacks the budget needed for their purchase. This is confirmed by the information regarding the value of the bicycles used to commute to the campuses: for students, the average price is around 180€, while for personnel (teaching and technical-administrative alike) it goes up to over 600€.

A total of 8% ownership of e-bikes, however, is on the increase when compared to data from previous years.

Table 13.3 - Types of bicycles owned by respondents - Survey 2

<i>Bicycle type</i>	<i>Owned by...</i>	<i>Bicycle type</i>	<i>Owned by...</i>
City bike (with gears)	42.3%	Gravel bike	6.9%
Mountain bike	31.5%	E-city/travel e-bike	4.4%
City bike (no gears)	30.0%	E-mountain bike	2.2%
Road sport bike	17.4%	None	1.9%
Folding bike	7.9%	E-folding bike	1.3%

Figure 13.1 show the distribution of approximate prices of the bicycles used for home-to-university travel⁶. It is clear that very cheap bikes are prevalent, but the right tail is still significant, due to the much more expensive bicycles owned by some of the staff.

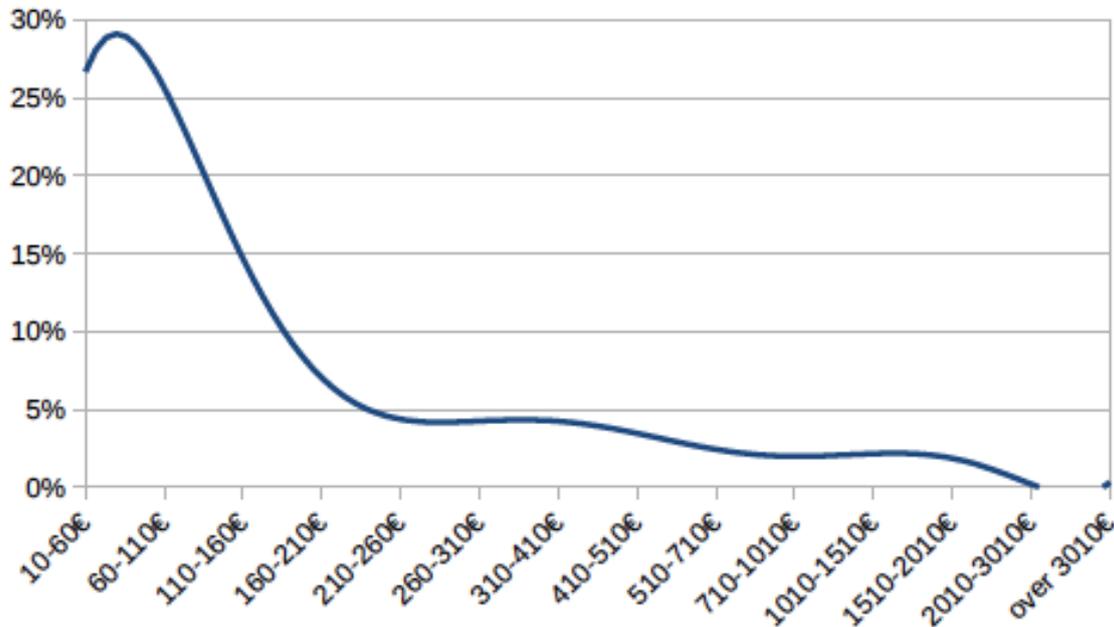
The issue of the economic value of bicycles brings us to the related phenomenon of *bike theft*, an issue that plagues more or less all major cities. In fact, bicycles are much coveted by thieves since they are not registered in any way and thus it is generally difficult to recover a stolen one, proving that it was your own property.

⁶ The shape of the distribution is smoothed to avoid irregularities due to the small sample size.





Figure 13.1 - Approximate price of bicycles used in commuting - Survey 2



On this issue, respondent was asked to evaluate the risk of theft in/around the campus, and to indicate whether they had actually been a prey of it. Both answers are reported in Table 13.4.

In the first, the goal was to understand if campuses were at risk location, and in this case whether the situation was even worse than elsewhere around the city. Fortunately, only a minority (6.6%) feel that is the state of things, but a much larger proportion do not feel any more secure than other place. In other words, some 60.7% of the university community coming by bike to campuses do not find them to be a safe haven for their two-wheeler. And this is justified by the alarming rate of larceny in or around campuses, where a total proportion 23% have seen their bikes disappear at least once. There are quite good reasons to commute using very cheap one, therefore.

Table 13.4 - Bicycle larceny at university - Survey 2

<i>Do you feel parking the bicycle at university is safe from theft?</i>	%	<i>Has your bicycle ever been stolen while parked inside or around your university?</i>	%
Yes	39.2%	No, fortunately never	77.1%
No, the risk is there, just anywhere else in the city	54.1%	Yes, once	18.8%
No, the risk is even higher than in other places in the city	6.6%	Alas, more than once!	4.2%
Total	100.0%	Total	100.0%

We can again move from these last considerations to examine another related topic, i.e., bicycle parking settings. This was investigated both at home and at university locations.

In general, we can reasonably say that in Southern Europe parking bicycles in the open along the streets near home, like you would probably do with cars, is considered unsafe and not a good option. The first question submitted was thus investigating what arrangements for keeping the bike at home respondents adopted (Table 13.5), On this matter a sizeable minority (17.4%) is in distress, a similar proportion has arrangements that





make using your bicycle frequently not such an enjoyable experience, being forced up and down stairs with your two-wheeler to put it on the road. Of course, this could for some people an obstacle that at least partly motivates *not* using a bicycle, although it is not possible here to infer the relevance of such a disincentive.

Table 13.5 - How do you keep your bicycle(s) at home? - Survey 2

I have a garage/other convenient closed room available and keep it/them inside it	61.2%
I have to take it/them upstairs or downstairs, but I can use a lift	4.4%
I have to carry it/them up/down the stairs	17.0%
I have no safe space and have to leave it parked outside	17.4%
Total	100.0%

At university the situation is somehow better, with only 9.5% of the sample declaring that bicycle parking there is totally left to chance. But then, it would of course be a reasonable goal to bring the 65.8% of cases that can park their bikes inside campuses up to full 100%, as this is a crucial part of a bike-friendly policy. This holds true also for the availability of unoccupied rack, as a sizeable minority (more than 27%) tends to find racks overcrowded when they arrive at their destination.

Table 13.6 - Bicycle parking settings at university - Survey 2

<i>Is bicycle parking available at your university destination?</i>	<i>%</i>	<i>Generally, can you find space for your bike in the racks?</i>	<i>%</i>
No, you have to park outside in the street and there are no nearby bicycle racks	9.5%	No, it's hard to find one since they are normally full or almost full	27.3%
No, you have to park outside in the street but there are nearby bicycle racks	24.7%	Yes, it's always easy to find one	72.7%
Yes, there are bicycle racks inside the university location	65.8%	Total	100.0%
Total	100.0%		

The last issue about the behaviour of cyclist that we consider is the *weather*, obviously a factor that many feel is an obstacle to systematic bike use. The question was very simple, enquiring whether or not people cycled under the rain. Responses were mixed: a good 45% declared their resilience, confirming the use of bikes when it rained; the remaining 55% indicated a prevailing fallback on public transport (more half of them), or resorting to walk or car (the latter being the smallest group).

Table 13.7 - Do you cycle also in case of rain? - Survey 2

	%
Yes!	44.8%
No, in that case I generally walk	16.7%
No, in that case I generally use public transport	29.3%
No, in that case I generally drive my car	9.1%
Total	100.0%

The last comprehensive topic to be analysed is the perception on the quality of the bicycle infrastructure in the university city, which was investigated in detail in Survey 2. While cycling paths are recognised as not always being the best - or feasible - solution for any urban environment, they are of course important and widely seen as *the* tangible





indicator of a bike-friendly city. Thus, the first request was an assessment of their mere presence, with the result of Table 13.8.

The split we observe has one third of the sample which finds their diffusion is adequate, while two thirds think they may be there, but certainly not with the expected density and connections between them.

Table 13.8 - Let's discuss cycling paths in your city. First, are they available? - Survey 2

Statement	%
Yes, a good network of cycle paths is in place	32.9%
Yes, but they are few and far between. There should be more of them	61.7%
No, they are practically non-existent	5.4%
Total	100.0%

However, since almost 95% of the cases do have at least some cycle paths available, it is reasonable to delve deeper into their characteristics. Again, a series of statements were submitted to check which ones were agreed upon significantly. All opinions are summarised in Table 13.9, ordered by the level of agreement, with the exception of the first one, which represents the opinion of a person who is globally happy with the cycle paths features; all others are possible defects.

Table 13.9 - How do you like the features of the existing cycle paths? - Survey 2

Statements	%
I think they are OK: well-made and comfortable to use	14.8%
They could be smoother in terms of surface	51.4%
They are not protected enough from abusive car parking	50.5%
There are too many holes and gaps	42.3%
They are too narrow, should be wider	32.5%
They are too jammed with walkers to be of real use when cycling	30.9%
The routes they follow are too convoluted, longer than necessary	18.9%
They are not properly maintained, with dirt and litter accumulating along the way	14.8%
They are so strongly separated from other streets than is often difficult to access or leave them when you need	12.6%

Fully satisfied opinions are few (around 15%); the most relevant issue with them is the uneven surface (51.4%), a problem that affects the well-being of cyclists much more than of motorists), reinforced by the presence of holes and gaps (42.3%) as well as dirt and litter (15%), all mirroring the insufficient maintenance work being done. The nuisance of larger vehicles parking and obstructing them is a close second (50.5%), while around 30% of the sample finds them to be quite narrow, especially when their location makes them busy with pedestrians as well. It must be remembered that when cyclists travel to reach some destination rather than for leisure, speed is a key factor just as it is for any traveller. Finally, some 19% complain also on the routes not being efficient in their length and linearity, forcing the cyclist to make a longer journey than it would be necessary.

Since a precious complement to any route is the existence of clear indications about its destination, possible detours, intermediate stops etc., the survey finally asked also about the presence of signposting along the cycle paths. as documented by Table 13.10.





Table 13.10 - Is there a reasonable system of signposts to indicate cycle paths, their destinations, distances etc.? - Survey 2

	%
Yes, it is quite easy to go around even if you do not know your way	25.4%
There are some signs but they are few and far between	51.8%
There is no specific signalling, you must know where cycle paths are and where they lead	22.7%
Total	100.0%

Again, results are mixed, as only a quarter of respondents finds the situation to be really satisfactory. The majority acknowledges that some signs are present, but is still complaining about their scarcity; and a full 23% finds that signposting is yet to be installed practically from zero.

14. The MUV app and game: participation and impact

Lastly, the Survey 2 questionnaire aimed to acquire some information about what the MUV playing experience was for participants, and what consequences it may have produced in opinions and behaviours. All 3Cs partner universities strived to engage as many people as possible in the challenges, with good albeit somewhat uneven results (as shown in Par. 9).

The participation to MUV in the Survey 2 sample was already discussed in Table 10.4: in all, a quarter of the sample was composed of MUV players; they added up to about 300 individuals.

The reasons that motivated people into taking part in the challenge are explored in Table 14.1; of all those proposed it is comforting to see that the mere self-interest was not the main reason in three or the four cities, even if it mattered quite strongly in Torino. From another perspective, this could be seen as positive in the sense that the resource invested in the prizes were well spent.

Anyway, the high degree of agreement on the other three items proves that a gamification strategy like the one promoted by MUV, while cannot be considered as *the* way to change the world for the better, actually inspires and engages people in the global effort for sustainability.

Table 14.1 - Why did you decide to participate in the challenge? - Survey 2

	Coimbra	Madrid	Montpellier	Torino
Environmental impact	68.0%	62.5%	46.2%	58.4%
Personal health	68.0%	50.0%	46.2%	55.2%
Competition and ranking	56.0%	75.0%	61.5%	46.2%
Rewards (Decathlon Gift cards)	24.0%	18.8%	23.1%	65.6%
Total	100.0%	100.0%	100.0%	100.0%

Of course, the main issue is how much playing in a challenge with a duration of only some weeks can have a lasting effect on long-term behaviour of participants Tables 14.2 and 14.3 try to address exactly such claim, the first enquiring on the possible change in behaviour induced by the game itself; the second looking beyond the short-term perspective of the challenge into the future.

The first question received somewhat mixed responses, but it is interesting to see that the cities that have less active mobility going on today are the ones where the change





was stronger. On the contrary, Montpellier - which has the best present-day record in active mobility displayed little changes linked to the MUV game.

Table 14.2 - Is participating to the MUV tournament motivating you to use active mobility more in your daily/weekly routine? - Survey 2

Statement	Coimbra	Madrid	Montpellier	Torino
Well, no: I have been moving on foot and by bicycle anyway for a long time now	40.0%	43.8%	84.6%	57.9%
A little bit, but the change is relatively small	36.0%	43.8%	15.4%	27.6%
Yes, I actually changed habits and enjoyed seeing my efforts counted by the app!	24.0%	12.5%	0.0%	14.5%
Total	100.0%	100.0%	100.0%	100.0%

MUV players were also asked whether playing in the challenge motivated them to increase their commute distance compared to their usual travel routine, and almost half of them (47%) declared that it actually did work that way.

Finally, the question reported in Table 14.3 offers an optimistic outlook, as an overwhelming majority show positive vibes about the gamification experience and has plan to view active mobility options more favourably in the future.

Table 14.3 - Do you feel positive about the increased active moving and think you will continue this way after the MUV tournament ends? - Survey 2

Statement	%
Yes, the real challenge is permanently switching to more sustainable mobility and the MUV game has inspired me to that	63.2%
It was nice to play, I may consider more seriously the active mobility options in the future	30.8%
It was nice for a bit, but don't think I will continue further	6.0%

After having examined the impact of the MUV initiative, we tried to complete the picture by checking how wide is the knowledge and use of mobility phone apps more in general. For this, the whole range of available products was divided into three main categories: those aimed at guiding people to places using various journey modes; those more fitness-based, that record active mobility in a health benefits measurement perspective; and the actual gamification apps like MUV. Table 14.4 shows that the latter is the least well-known and used type, while navigation guides are of course well known and widely used (with expected diffusion perhaps even higher than what suggested here - percentages as low as the 31.2% in Coimbra are even surprising in this field). In any case, there is still about a quarter of the sample not used to the benefits of any of these kinds of apps. In the future outlook where the *Mobility as a Service* approach is gaining ground, sustainable mobility will probably further require such tools as a key to organise our life in movement with the least impact on the environment.





Table 14.4 – Have you already used this/other mobility apps to track/guide your moving around? Survey 2

Statement	Coimbra	Madrid	Montpellier	Torino
No, never	37.6%	20.8%	23.1%	28.1%
Yes, I use/have used Google Maps or similar apps to guide me to places	31.2%	50.0%	47.7%	56.0%
Yes, I use/have used health apps that track active mobility as fitness exercises	28.3%	29.2%	27.7%	30.9%
Yes, I have already used gaming apps, MUV or similar, to compete in tournaments like this	2.9%	16.7%	15.4%	5.6%

