

OUTPUT O.T4.1

Pilot-Based Evidence and Guidelines on Mobility Patterns



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1 UNDERSTANDING OF MOBILITY PATTERNS VIA COLLECTED DATA

During the project duration, various tools and setups were developed and deployed to generate and collect different types of data. At the beginning, an extensive survey of existing, historic and circumstantial data was carried out. The focus lay on gathering data from the specific pilot sites on socio-demographics, infrastructure, mobility options and mobility behaviour of the local residents. This data provides the basis for surveys conducted during the project – as a background and point of reference.

The characteristics compiled were for example:

- Number of inhabitants, population density, age distribution, employment, average income, etc.
- Economic parameters of the region
- Spatial parameters: area, land use, etc.
- Current expenditures for environmental protection
- Touristic activities in the region
- Household characteristics
- Mobility behaviour of inhabitants: average number, duration and distance of trips per household member
- Number of passenger cars, average age of passenger cars

The data generated within the Melinda project came from multiple collection tools and survey methods. An awareness survey was developed to investigate the people's attitudes towards environment and their knowledge about impacting factors and effects regarding climate change, while surveying general sociodemographic data as well as mobility behaviours.

The awareness survey, for example, collected the following parameters:

- General socio-demographic data (e.g., age, education, occupation, address, household size, etc.)
- Mobility patterns (e.g., modes used; mobility capital: availability of vehicles, licenses, public transport passes; knowledge about and experiences with different mobility services; etc.)
- Emotional connotations within mobility (e.g., aspects associated with different modes of transport)
- Statements on mobility related costs
- Statements on environmental impacts of transport
- Statements on health-related aspects concerning active mobility

In some pilot sites the adapted version of the Melinda Mobility App was successfully deployed. With this app, the people's mobility choices in reference to their preferences on environmental, economic and health aspects were collected. To make up for low numbers of mobility recordings, due to the Covid pandemic and restricted travel options, another data collection tool was developed.

Lead by UNIMIB, the Melinda City Finder (see section **Errore. L'origine riferimento non è stata trovata.**) was designed and very successfully deployed in multiple pilot regions.

1.1. Greater Lyon pilot

The focus of the pilot activities in the area of Greater Lyon and Greater Annecy¹, France, lay on health as an incentive for behavioural change in mobility. Increased numbers in active mobility, cycling and walking, were envisaged by the promotion of the health effects of “human-powered” mobility.

To investigate the effects of communicating the health impacts of active mobility on the mobility choices, 50 volunteers were recruited to partake in this experiment. The participants were asked to report their weekly mobility behaviour. By using a tracking tool, they were asked to record the number of steps, kilometres travelled and activity time amongst other data. Overall, more than 600 weekly data sets were generated in this pilot region. Over a duration of six months, the experiment’s participants answered weekly follow-up questionnaires, reporting on their perceived health effects. In addition, they provided answers to two psycho-sociological questionnaires.

The project wide awareness survey generated 34 data sets in the pre-Covid phase.

1.2. Pordenone pilot

In the Italian pilot area centred around the municipality of Pordenone, coordinated and well-aligned mobility interventions were the focus within the Melinda project duration. In particular, the development of a master bicycle plan, building on the insights gathered during the project activities was envisaged. This shall improve the inter-municipal connections and result in sustainable, accessible and safe cycling routes connecting the nine municipalities in this pilot region.

Across Italy, the general awareness survey was answered 39 times before the pandemic broke out and the questionnaire investigating the impacts of Covid generated 1023 data sets.

1.3. Maribor pilot

In the pilot site in the city of Maribor, the main objective was the support of sustainable mobility behaviour by introducing and promoting an electronic tool to communicate relevant transport parameters between different stakeholders. In this context, reliable and extensive data as a basis for analysis and the identification of optimal interventions is very important. The focus lay on the collecting people’s needs within the context of mobility and the translation of these factors into knowledge for the relevant stakeholders.

The Melinda App was deployed in the region, but the usability was lacking, and therefore the data collected via this tool is limited.

1.4. Ebersberg pilot

The pilot in Ebersberg focused on the building and expansion of a network of hitchhiking benches in greater Munich, Germany. The hitchhiking infrastructure is designed to improve the intermodal mobility options in the prevailing rural area. The promotion of car-pooling via the provisions of physical hitchhiking benches was the predominant objective in this pilot region.

¹ Due to the impact of the Covid 19 pandemic, the pilot project in Greater Annecy had to postpone, it will however take over the procedure that adopted in Greater Lyon and its activities will go beyond the Melinda project. For this reason, we only present the pilot in Greater Lyon.

To facilitate this, the network coverage was to be analysed and a concept for the improvement and expansion of the network was to be developed. The synergies between the analogue benches and digital car- and ride-sharing offers as well as the public transport network and their interoperability were also investigated within the Ebersberg pilot.

In late 2020 to early 2021, Ebersberg carried out surveys within their network of stakeholders and utilising the distribution within their regular Round Table discussion and networking events. The responses of 30 people were collected to the project wide survey within this pilot site. In addition, an extensive survey on the potential, preferable characteristics and hindrances in the usage of hitchhiking benches was conducted. More than 500 people were asked to state their type of activity and range when using the carpooling services, as well as the relevant functions and furnishings of an optimal hitchhiking bench. The Melinda App was also deployed and recorded data on the resident's mobility choices in greater Munich.

1.5. Switzerland pilots

The Swiss pilots focused on the support of carpooling services (hitchhike and ridesharing) in rural areas by investigating the provider's business models and analysing the socio-demographic characteristics of the population and the carpooling users. A survey collecting the relevant information was developed, and filled in by 27 households. This survey was conducted for Taxito ridesharing services in Chur/Maladers. Questions investigated general characteristics of users and non-users, their mobility capital (ownership of driving licenses, vehicles, public transport passes, memberships in carpooling platforms, etc.), their use patterns and other parameters within the context of ridesharing usage or non-usage. In addition, the service providers also contributed to a survey and reported key information from their perspective: temporal and spatial parameters of ridesharing trips. Already before the pandemic broke out, 57 people within the Swiss pilot site completed the awareness survey.

1.6. Vorarlberg pilot

The pilot site in the Austrian province Vorarlberg set out to reduce individual traffic and the use of private cars by generating a shift towards public transport. In particular, the cross-border commuter traffic was in the focus of the pilot activities, and innovative mobility solutions in this context were investigated. An adapted version of the awareness survey was conducted in face-to-face interviews in 2019. Here, the questionnaire was completed by 155 participants. Furthermore, 58 people entered their responses in the online survey. The post-Covid survey was filled in by 86 respondents. The Melinda app, which was developed and adapted by FHV, was at the centre of their engagement strategy. The app was downloaded by 59 users in Austria and generated trip specific information collected by GPS logs as well as the users' mobility preferences and inclination towards environmental and health aspects plus cost and time efficiency.

2 PILOT RESULTS AND LESSONS LEARNT

2.1 Greater Lyon pilot

Key findings from the pilot show that motivation to engage in physical activity remained high and stable over time. At the end of the pilot experiment, 73% of the participants had effectively replaced some motorized trips with active trips. The weekly time spent on physical activity increased significantly from 2.92 to 5.23 hours from the beginning to the end of the experiment. Thanks to the

positive results and enthusiasm from the participants, Greater Lyon is planning to carry out the project on a larger scale, with the 9,400 employees of the local authority as part of the implementation of its Low Emission Mobility Zones policy.

The pilot-based evidence highlights that it is not difficult to find and engage participants in the experiment of active mobility (cycling and walking). Behaviour change in mobility patterns is possible when participants are motivated by "health and well-being benefits" as well as they can see the improvements as a result of the participation. Yet it is vital to maintain the interest of the participants during all the time of the project. To do so, three measures should be taken:

- Meetings (kick-off, during the project, and at the end of the project) are held with specific animations to motivate the participants. For animation, it is necessary to be playful, create spaces and times of exchange.
- Feedback from the group of participants should be taken seriously. The group effect is a powerful lever. The company as the social community is the place where there are the most levers for the change of mobility.
- A simple and easy tool to monitor changes in travel patterns for active modes should start automatically and require no action from the participants.

Furthermore, in order to success in this kind of projects, the employer as a key project partner has to give authorization to participate to the project meetings. The participation to the project should stay simple for the users. Supports from key project stakeholders (local authorities and the employer) and animation for employees (participants) play a crucial role in promoting active travel modes for employees.

2.2 Pordenone pilot

Key findings from the Pordenone pilot show that participating in the Interreg Alpine Space Program via the Melinda project has been an effective mean to gather politicians and technicians from 10 neighbouring municipalities together. This is central for building shared and collaborative mobility services (i.e., bike-sharing) in the pilot territory characterized by small municipalities with diverse governance structure. The result of this collaboration is that municipality of Pordenone has signed an agreement with neighbouring municipalities to work together on European policies and apply together as a "wide area territory" to upcoming funding opportunities. The pilot has served as a platform to test this new form of working together. Local policy makers and technicians recognize the wider impact and more significant effect of their work at the meso level (local urban development administration). These insights provide a valuable lesson learnt for local policy makers in designing and implementing a master plan of shared mobility services.

2.3 Maribor pilot

The Slovenian pilot was successfully set up a web application for the Sustainable Mobility in the City of Maribor and upgraded the municipal spatial platform with data on sustainable mobility. These digital tools gather available but dispersed data on the supply and demand for sustainable mobility services as well as integrate new data from a survey of over 600 respondents on mobility behaviour. Regular maintenance and provision of the sustainability of data on sustainable mobility is done by the municipal service for GIS and data processing. These open access tools can help city's expert services in the implementation of activities and measures within the integrated transport strategy of the city

of Maribor - analysis of the current state of mobility, spatial and other data and in upgrading the management system of sustainable forms of transport in the city. Data provided by these tools can support Maribor's decision-makers for strategic decision-making in the field of sustainable mobility. Service providers in the city can operate their services more efficiently and more environmental friendly as well as develop new mobility services based on open access data.

Findings from the survey and pilot activities indicate that changing the method of using the means of transport (modal split) and related reduction of carbon footprint in urban environments is possible, as long as all stakeholders in this system are aware of the situation in this area and know the advantages provided by using sustainably designed means of transport in a particular environment.

2.4 Ebersberg pilot

Results from the pilot survey show that a majority of users of hitchhike benches are between 36 and 60 years old. Many individuals see themselves far more likely to be a driver than a user. The benches are mainly used for recreational mobility due to the uncertain duration of waiting time. This pilot-based evidence could be used for increasing adoption of hitchhike benches, e.g., use marketing instruments to target suitable age groups of potential users. In a rural context, providers of hitchhike benches should cooperate with touristic service providers to promote the use of this ridesharing services.

The integration of the hitchhike benches into the public space is a very important factor for the success (high user numbers) of this form of mobility for the perceptibility and presence in the everyday life of the local people. According to the survey, almost 60% consider the benches to be moderately to poorly integrated and better integration seems possible through the following four measures: participation of more municipalities in the network of hitchhike benches, offering more locations within a municipality, better signage and connection to all relevant public transport stops. Moreover, to make an analogous form of mobility such as ride-sharing (with or without benches) a success in an area, motivated service providers are needed in the individual local communities for site selection, application and/or financing. Network connections to other active regions are advantageous in order to demonstrate that no solo effort is being made with unproven means, but that an alternative form of mobility is being promoted.

2.5 Switzerland pilots

Some lessons learnt for transport authorities in rural areas can be derived from Chur/Maladers pilot's findings. A private-public cooperation of a ridesharing programme can help to improve the transport quality in sparse populated regions with high car ownership. Its success depends greatly on the close cooperation between local authorities of the municipalities, the canton's transport authorities, the ridesharing operator as well as the local people. The acceptance of local taxi companies and local people can be increased by active awareness campaigns. Moreover, the Taxito notice boards include local taxi numbers, so that Taxito passengers can order a taxi, if they feel like they do not want to wait longer for being pick up by private cars provided by Taxito.

The integration of notice boards in the network of local buses and regional stations can encourage modal shift towards more sustainable mobility behaviour. Furthermore, it occurs sometimes that Taxito passengers while waiting for being pick up by a car got in the bus as it arrives, instead of continuing to wait. In summary, the ridesharing was seen as a simple, sustainable and suitable mobility

solution for extending public transport services to municipalities of Chur/Maladers where no public transport services existed.

Insights from the NaturPark Thal hitchhike pilot indicate that participatory planning for engaging a wide range of stakeholders was a useful method to gain financial and emotional support from local people, policy makers and local agencies. This is particularly crucial for a new form of mobility services. The use of a Hitchhike platform- an existed company- could reduce risks of failures because the platform is proven that it works.

2.6 Vorarlberg pilot

The comparison between the previous research results and the survey in Vorarlberg pilot shows that the citizens in Vorarlberg greatly changed attitude towards sustainable means of transport from 2011 until 2019. “Car & motorbike” decreased interest in the past nine years whereas, “public transport” and “walking & cycling” gained attraction. The survey’s results also indicate that Vorarlberg residents use public transport to the same extent as they do by bike or on foot. Vorarlberg therefore can be used as a model for other regions that seek to promote sustainable mobility.

Another insight from the pilot is that citizens are very restricted to share mobility data. Mostly, in their opinion, it is considered as a monitoring tool of their mobility patterns and behaviour. To mitigate the prejudices of the target- and stakeholder groups, mobility App developers need to include “voluntary” measures into the IT component – e.g. the voluntary upload of the mobility data to the server. As further measure, participation to public events to proactively disseminate the “harmless” of the Melinda App. In doing so, cooperation with several stakeholders within the field, e.g. Energy Institute Vorarlberg, Walkspace conference, SaMBA project, Long Night of Research, etc. plays an vital role in disseminating the Melinda App.

3 MELINDA CITY FINDERS

3.1 A new tool for data collection

Melinda City Finder (<https://melinda-project.sociologia.unimib.it>) is an interactive data collection tool, inspired by the method of *vignettes*, adopted usually in qualitative social research in the form of texts, images or other forms of stimuli which research participants are asked to respond (Hughes and Huby, 2002)². These stimuli show hypothetical scenarios describing situations on which the expression of an opinion is requested to detect attitudes and preferences underlying respondent's habits.

The need for reaching the highest possible number of respondents pushed the tool designing team (composed by Unimib with BAUM and Austriatech as partners) to opt for a digital approach and delivery channel. The aim was then to design an interactive web tool of immediate understanding, appealing in terms of design and interface, and as much as possible entertaining in order to be potentially shared among respondents' networks as commonly happens for tests and quiz games widespread in all the most used social network platforms.

² Hughes, R., & Huby, M. (2002). The application of vignettes in social and nursing research. *Journal of advanced nursing*, 37(4), 382-386.

Thanks to a strict connection and collaboration between the project partners and the IT developer Aton IT (<https://atoninformatica.it/>) the new tool has been built between the end of 2020 and the beginning of 2021, then launched on May 2021 (and planned to be running up to the end of the project, in August 2021), in a **desktop** and **smartphone version** and in **four languages**: English, French, German and Italian that can overcome the different national languages of all the project partners.

Figure 1 – Melinda City Finder Landing page (English desktop version)



Melinda City Finder works creating a “path” through a series of scenes (or situations) into which the respondent has to make choices or positioning themselves according to the context described.

Through a set of scenes, the tool allowed the collection of data about:

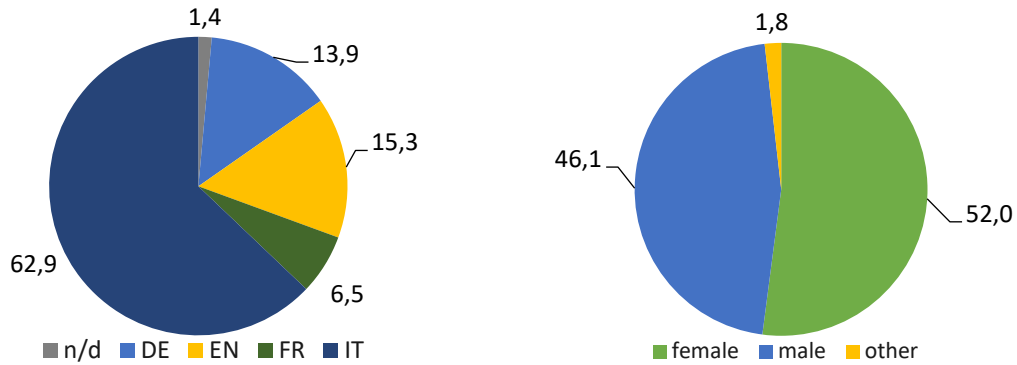
- Respondents’ profile (gender, age, household composition, context of residence, occupational status, mobility capital)
- Mobility ideal-type
- Attitudes and behaviours about mobility and safety, mobility and sustainability

There were 830 respondents who participated in the Melinda City Finder survey.

3.2 Respondents’ profile

Even though a specific question about the country of residence was not asked in the webapp, information about the “cultural background” can be detected considering the language spoken by the respondent. More than 50% of the respondents come from Italian-speaking regions, followed by English speaking people (speaking other language than Italian, German or French in this case), German and French (Figure 1). From a gender point of view the sample seems to be balanced between males and females.

Figure 2 – Respondents' profile: language spoken (left) and gender (right).



The sample is composed mainly by **workers and students**. The majority of the respondents comes **from urban areas**, while only around 10% of them come from rural areas. Considering the **household structure**, more than 60% of the sample lives as a couple (35,9%) or in a family with children 35,9%. Nearly one-fourth live alone. More than half of the sample is composed by Millennials (born between 1982 and 2000), one-third belongs to the Generation X (born between 1965 to 1982) and about 10% is classified as baby boomer (born up to 1964). The youngest, members of the Generation Z (born after 2000), are just a very small number. Data on **mobility capital** show a main availability of private cars (71,4%), but also a strong diffusion of bicycles (70,4%, a potential leverage for active mobility enhancement). An interesting aspect is represented by the quite high proportion (20%) of mobility sharing services.

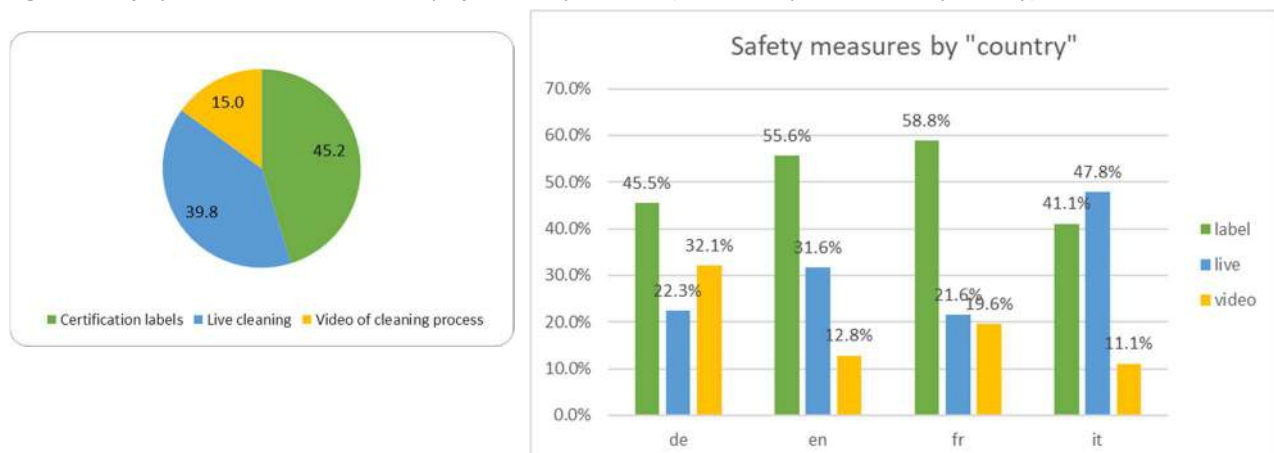
3.3 City Finder's results

3.3.1 Safety

The tool investigated at first few aspects related to safety and mobility, asking what kind of communication people prefer and trust the most in terms of sanitation procedures certification, being possible to choose between **certification labels**, **video demonstrations** or **live cleaning** performances. People generally trust providers and prefer the adoption of labels certifying cleaning procedures than videos directly describing what is usually done for sanitization means.

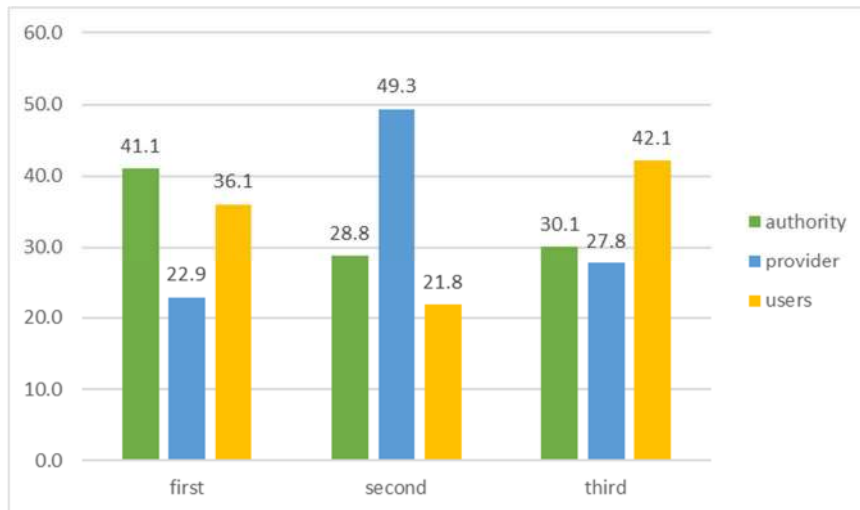
Relevant but less strong the attractiveness of cleaning procedures on spot, even if the “trust pattern” changes according to the cultural context or background: if French and English-speaking respondents mainly adhere to this overall figure (with the first ones recording the highest degree of trust), German-speaking respondents tend to prefer video-descriptions, while Italians would favour the live cleaning performances (Figure 3).

Figure 3 – Safety measures communication preferences by channels (overall sample and detail by country)



When asked to choose who should be considered the most responsible actor in the mobility system for safety promotion and guarantee the sample mainly addressed **Authorities**; followed by **Providers** as second best, with the relative highest mark, and then, as last, **Users** (Figure 4).

Figure 4 - Responsibility ranking for safety on PT



Nevertheless, when we compare countries the figure consistently changes: English-speaking respondents consider the users as most responsible, while French-speaking respondents' authorities. German and Italian-speaking respondents seem to express the similar opinion in this issue. The third element considered for analysing the relation and attitudes of people towards safety-related issues in mobility consists of the measure of the maximum level of crowding accepted. The tool allowed to choose between 3 different levels (25% - 50% - 75%), considering a situation in which nobody could stand on the mean and where masks were compulsory.

Figure 5 – maximum crowding level accepted (75% - 50% - 25%)



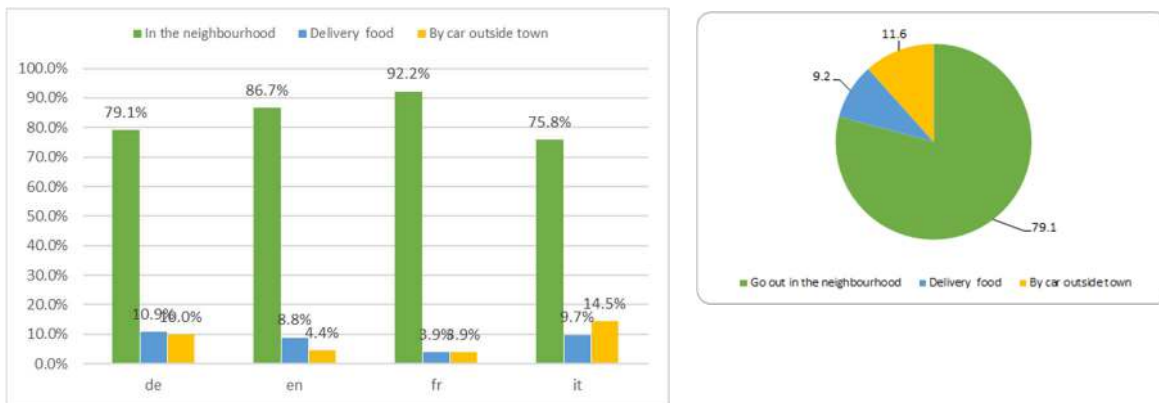
The results show that people tend to generally tolerate a relatively high degree of crowding on the public transport (PT) services. Only less than 5% of the sample would not tolerate more than 25% of crowding. 61,5% of the sample would at least travel by PT with half of the capacity allowed. Once controlled for the cultural background, as usual, the figure changes: the highest level of trust is again recorded among French-speaking respondents (where no one would prefer 25% of crowding as a maximum), followed by German, English and Italian-speaking respondents.

3.3.2 Lifestyles, attitudes and sustainable mobility perspectives

Beside the attention to safety, the City Finder tool also addressed the preferences, in terms of lifestyles towards different mobility modes. A twofold scenario has been developed: one presenting a situation in which a dinner with friends has to be planned, the other related to groceries purchase habits. In both cases the respondent has to choose between 3 options representing three different mobility models: private car driven; 15 minutes neighbourhood model; home delivery model.

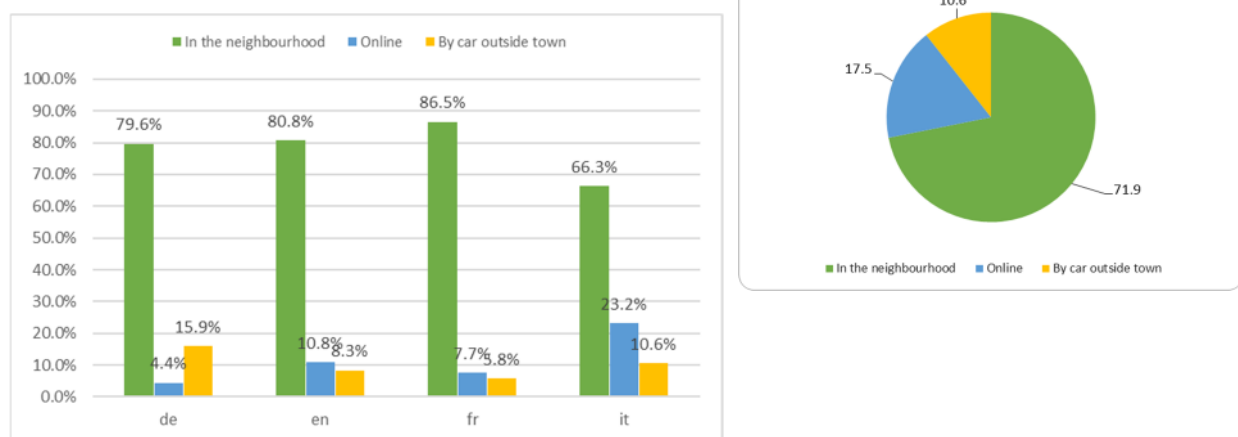
In the first case 8 out of 10 people showed to prefer to perform leisure activities in **the neighbourhood context**, while almost the same proportion is then divided into **delivery services** lovers and **car-driven mobility** leisure option (Figure 6).

Figure 6 – Planning a dinner scenario: whole sample output and by “country”



The figure changes when we consider the cultural background: French speakers show a higher preference for the 15 minutes city model, while Italians have a relative higher amount of car-driven mobility attitude. However, this pattern can be influenced by the local context of residence and the opportunities available: when controlled by this property a general decrease in delivery services and car-driven mobility preferences is recorded. In terms of age *cleavage* **gen X** are mostly interested in the **15 minutes city** model, while **Baby Boomers** are more prone to **car-driven mobility**. Millennials show a higher friendliness with **home delivery**.

Figure 7 – Buying groceries scenario: whole sample output and by “country”



A similar figure is also found for the “buying groceries” scenario (Figure 7), even if with a lower percentage is recorded for purchases in the neighbourhood, while online services show a degree of preference double than in the previous situation.

Considering the cultural background, the French-speaking respondents are still more interested in the 15 minutes city model, while German ones show a higher preference for car-driven purchases. Italian-speaking respondents seem to be more prone to online purchases. The figure is influenced by the urbanization degree, showing a similar pattern as mentioned above. In terms of age cleavage Generation X individuals are, with a slightly higher degree, interested in **home delivery**, while Baby Boomers are more prone to **car-driven mobility**. Millennials show a higher friendliness with the **15 minutes city model**.

Biking incentives: The tool went deeper into the analysis of attitudes towards mobility options, in particular the potentiality of biking promotion. Respondents were so asked to choose the biking incentive they considered the most effective for pushing them to bike (or bike more). The choice was between three different leverages: having an **enjoyable** biking path; having an **economic** incentive (€/km); having a **safe parking** system at destination.

In general, it can be seen how much relevant is the presence of an **enjoyable bike path** for pushing people towards this active mobility. More than one-fourth of the respondents reported the importance of **having a safe parking solution** for biking. Residual is the amount of those who are interested in an economic incentive. A slight difference is recorded among the various cultural contexts, with Italians declaring a higher preference for enjoyability of the paths, French-speaking respondents showed a relative bigger interest for safe parking while German-speaking for economic incentives. When controlling for residential context, no significant relation can be found: a higher trend in economic incentive relevance is recorded for small cities and rural areas while metropolitan cities are more interested in enjoyability of biking paths. Baby Boomers seem to appreciate more the safety of parking while Millennials the presence of economic incentives. Workers prefer enjoyability of paths, while students economic incentives.

3.3.3 Future perspectives

The City Finder asked respondents which the mobility solutions they would mostly like to have access to in their “ideal city”, introducing nine different options, belonging to car-driven, Public Transport driven and Active Mobility. The results show that Metropolitan residents as well as French and English-speaking respondents are mostly interested in active mobility friendly cities where PT has a good quality service (high frequency and low costs). Individual motorized mobility is usually well accepted if there is a relevant amount of people who are strongly in favour of an extension of car use (in small/medium-small and large cities mainly).

Figure 8 - mobility solutions that people would like to find the most in the “ideal city”

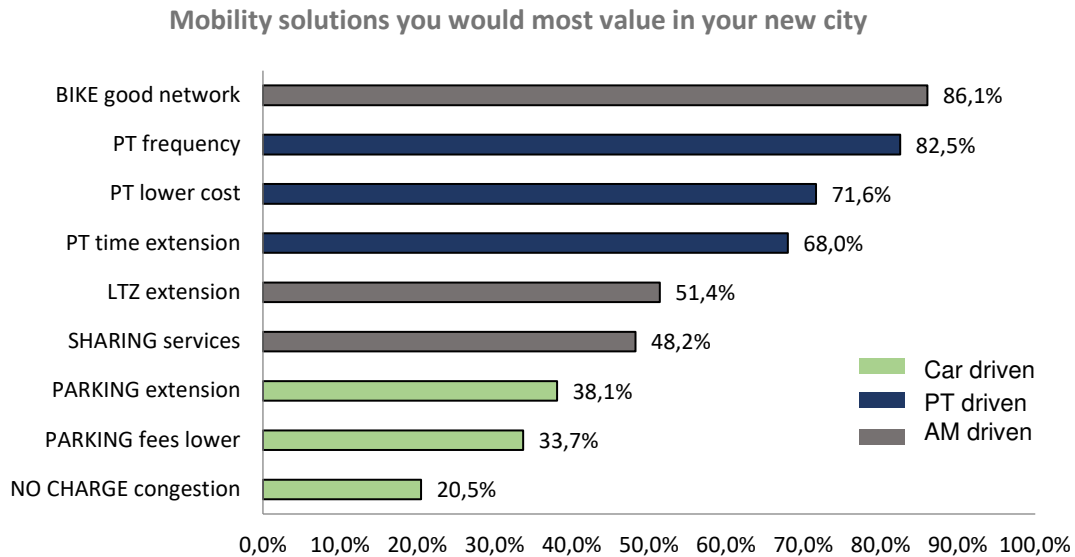
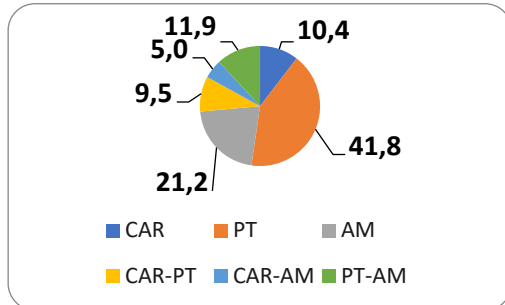


Figure 9 – Mobility ideal-types profiles



As can be seen in Figure 9, a pattern of different profiles has been developed on the base of the data collected. Since respondents could choose a maximum of 5 options mobility-profiles have been created according to the combination of solutions chosen. More than 60% of respondents would like to promote PT or active mobility dedicated solutions, and only 10% is more focused on car friendly options. Interesting is also the presence of about 11% of respondents who would equally consider Active Mobility (AM) and PT related solutions.