



MyWay

EUROPEAN SMART
MOBILITY RESOURCE
MANAGER

MyWay: European Smart Mobility Resource Manager

D6.2 - Evaluation of the MyWay integrated system

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Authors	Evangelia Portouli, Panagiotis Pantazopoulos, Theodoros Theodoropoulos (ICCS)
Co-authors	Kate Pangbourne (UNIABDN)
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EXECUTIVE SUMMARY

The MyWay project aimed to develop components and an integrated application so as to facilitate sustainable mobility, combining all sorts of transport services, public and private, regular and flexible, providing a personalised service offer, adapting route and modality suggestions in real time, monitoring the parameters affecting service offering performance and gathering and maintaining users' feedback about the quality of services to assist service improvement.

The present document constitutes the Deliverable 6.2, entitled "Evaluation of the MyWay Integrated System". The aim of the work reported in this deliverable was to evaluate the technical performance of the integrated MyWay system, its usability and acceptance by users and its expected impact. The evaluation involved both objective data from the log-files and subjective data collected from users regarding their perceptions of MyWay's technical performance, usability, user acceptance and users' opinion of MyWay's impact on their experience of travel.

The tests with the integrated MyWay application took place in the three Living Labs (LL) of the project, in Catalonia, Berlin and Trikala, from September to December 2015. Participating users were asked to download the MyWay application and use it, as they would in their everyday life, without any specific instructions. The user data was collected through survey instruments and through detailed usability tests called Scripted Journey Plan (SJP) tests, conducted with a small group of users in each Living Lab. There were also interviews with key stakeholders in each LL. Objective data was collected as well as subjective users' perceptions and estimations via the background and three Subjective Evaluation Questionnaires (SEQ), which were completed at three time points. The number of active installations of MyWay by 14 March 2016 totalled 670. A total of 371 of these users voluntarily registered in the MyWay portal to participate in the evaluation activities, and completed the background and SEQs. The users' subjective responses were coded in a -2 to +2 scale, where -2 is the worst and +2 the best rating, while 0 is the neutral rating, and a weighted average of responses for each question has been calculated. The following findings should be considered with care, since the number of users was low, and should be interpreted as tendencies, which have to be verified with a bigger number of users.

The MyWay response time depended on the network area covered and on the number of subplanners being integrated. The majority of users in all Living Labs perceived it as comparable to the response time of other commercial and mature planners they were using. They also perceived the information provided by MyWay as of similar reliability to the information provided by mature commercial solutions. The Metaplanning approach of MyWay can help in cases where there is no public transport-only plan provided by single subplanners. The Metaplanner can offer extra intermodal options, especially for longer trips, which means that the user can use, for example, bike and train instead of car for the whole journey. Furthermore, the Metaplanner can deliver intermodal trip plans with noticeably shorter duration than public transport only plans. The participants in the Scripted Journey Plan tests in all LLs found that the journey plans 'mostly' met their expectations. Users in Catalonia and Berlin responded that MyWay suggestions are in accordance to their needs and expectations as much as the suggestions by other commercial planners. Only 0.2% of the requests in Catalonia resulted in an "exception" response by MyWay,

while none did so in Berlin and Trikala. The MyWay exceptions were much lower than the exceptions of the sub planners queried by MyWay. These findings are very encouraging and indicate the added value of the MyWay approach.

Users in all Living Labs stated that they would like to use MyWay as frequently as other commercial mature planners, they did not find it more complex or more inconsistent than other commercial planners, they agreed that people would learn to use MyWay as quickly as other commercial planners, and they agreed that they need to learn less things before get going with this system than with other commercial planners. Users responded that MyWay is as easy to use as other commercial planners and that they felt as confident when using it as other commercial planners. Users in all Living Labs stated that they rather trust the MyWay journey recommendations and that they feel rather sure that their journey will go as planned when using MyWay. These findings are positive since MyWay was compared against mature products.

It is worth mentioning, that the number of MyWay application downloads continues increasing even after the project end, showing that there is a vivid interest for MyWay. Users stated that they used MyWay at the same frequency as other commercial planners. Users in all Living Labs rated MyWay as useful and satisfying. The users' immediate reaction to MyWay and their overall satisfaction with MyWay was positive in all Living Labs. Users in all Living Labs did see a benefit of having access to MyWay. Users estimated that their possibility to choose optimal route according to their preferences will slightly increase when using MyWay.

As the number of users and the duration of using MyWay are small, the present findings have to be considered with care and should be seen as trends. Still, users do seem to perceive MyWay as something that may have a positive impact on supporting more sustainable travel behaviours. Despite this encouraging result as regards mobility in general, the availability of information about environmentally-friendly transport modes via a multi-modal trip planner alone is not enough to achieve a shift of travellers to such modes. Transport planning authorities should adequately design such services and integrate them with the rest of the traffic network, for them to be widely used by travellers.

Finally, the stakeholders made some valuable comments as regards the reasons why users will use MyWay, its strengths and weaknesses, opportunities and threats. According to their opinion, MyWay may provide strategic benefits for transport operators to integrate their data, for example about car-sharing, into MyWay, the application can be beneficial for all types of city visitors, not only commuters, but also tourists and business travellers, and the data collected by MyWay can be linked to the urban mobility plans of each city. According to stakeholders' opinions, caution should be paid, among others, to the reliability of data provided by service operators, as unreliable data may undermine the user's trust in MyWay. Data protection issues should be carefully considered, before making use of data collected by MyWay. All these comments and suggestions should be considered in the exploitation strategy of MyWay.

1. INTRODUCTION

1.1 About MyWay

The aim of MyWay project was to develop components and an integrated application so as to facilitate sustainable mobility, combining all sorts of transport services, public and private, regular and flexible, providing a personalised service offer, adapting route and modality suggestions in real time, monitoring the parameters affecting service offering performance and gathering and maintaining users' feedback about the quality of services to assist service improvement.

The level of achievement of these objectives has been evaluated in three different Living Labs which have been implemented in three different European areas, Catalonia, Berlin and Trikala. The evaluation activities were conducted within the framework of WP6, Evaluation, Governance and Business Models, of the project. The evaluation activities were conducted according to the methodology and using the data collection tools which were specified in Deliverable 6.1, MyWay evaluation methodology and plan [MyWay D6.1], and Deliverable 1.4, Scenarios, KPIs and guidelines for validation - Final version [MyWay D1.4], of the project.

1.2 About this document

The present document constitutes the Deliverable 6.2, entitled "Evaluation of the MyWay Integrated System". The objectives of the work reported in this document were to analyse the data collected during the evaluation activities that took place in the three Living Labs of the project, so as to evaluate the hypotheses formed in Deliverable 6.1 [MyWay D6.1], as regards (i) the actual technical performance of the integrated MyWay system, (ii) the users' perceptions about the MyWay performance and usability, (iii) the acceptance of MyWay by users and (iv) the users' and stakeholders estimations about the impact of MyWay.

2. EVALUATION METHODOLOGY

2.1 Set-up

One of the aims of the activities in WP6 was to evaluate the technical performance of the integrated MyWay system. This was based on analysis of objective data and of the users' perceptions. A second aim was to evaluate the usability of MyWay. This was done by conducting detailed usability tests, the Scripted Journey Plan (SJPs) tests with a small group of users, and by analysing the subjective opinions of users regarding various usability issues. Moreover, the activities aimed to evaluate the acceptance of MyWay by users and their estimations as regards the MyWay impact.

The evaluation activities were scheduled in three phases. The first one was a preparatory phase (Pre-phase) with an initial, but mature, version of MyWay, which took place in all three Living Labs in the period January – February 2015. The objective of this phase was to identify problems with the application and to evaluate the methodology for data collection and analysis itself. According to the findings, the evaluation methodology was adapted and the data collection tools were revised, to be more intuitive and less intrusive for users.

The next phase (Phase 1) took place from March to May 2015 and involved an almost complete version of MyWay, with all key functionalities implemented except some of the most innovative like the Trip Follower or service booking integration. The objective of this phase was again to identify problems and feed them back into the development Work-Packages, so that the final MyWay version could be optimised. The final phase (Phase 2) took place from September to December 2015 and it involved the final fully integrated version of MyWay. All these activities involved persons who were asked to download the MyWay application and use it, as they would in their everyday life, without any specific instructions. The results of this phase are representative of users' perceptions and expectations, as they refer to the complete MyWay release. The detailed usability tests were conducted in two rounds and involved small groups of users in each Living Lab who were instructed to conduct specific scenarios in real conditions in accordance to the user stories of WP2, a script having been used beforehand to test that the scenarios were in principle possible. The aim of these tests was to detect technical or usability problems.

Finally, interviews with stakeholders were conducted in each Living Lab, using the methodology and form presented in Deliverable 1.4. The aim of the interviews was to capture their willingness to support the use of MyWay, their opinions and suggestions about the exploitation and business potential of it and their expectations about its impact. The interviews were conducted in two rounds. The findings of the first round of interviews are reported in Deliverable 1.4 [MyWay D1.4]. The stakeholders' opinions as collected in the second round of interviews are analysed in the present deliverable.

2.2 Hypotheses

The hypotheses relevant to the technical performance of MyWay were the following:

- **TH1:** Users perceive the MyWay response time to their request as normal / similar to that of other planners
- **TH2:** MyWay information is reliable / as reliable as that of other planners being used by the users over the same period.
- **TH3:** MyWay suggestions are followed in at least 70% of requests, in which users have accepted to be tracked.
- **TH4:** MyWay suggestions are more in accordance to users' needs and expectations than those of other planners that the users utilise over the same period.
- **TH5:** MyWay fails to provide a response in less than 5% of requests.
- **TH6:** Users perceive that the mean journey time is reduced for similar trips compared with the "without MyWay" condition.

The hypotheses relevant to the usability evaluation were the following:

- **UsH1:** More than 50% of users are satisfied by the MyWay usability.
- **UsH2:** Users' satisfaction by the MyWay usability increases with time.

The hypotheses relevant to the user acceptance evaluation were the following:

- **UAH1:** Frequency of MyWay use increases with time.
- **UAH2:** Users' perceived usefulness of and satisfaction by MyWay increase with time.

The hypotheses to evaluate the users' estimations about MyWay impact were the following:

- **SEH1:** Attitude and motivation towards MyWay increases with time.
- **SEH2:** Users use private car less frequently in the "with MyWay" condition.

2.3 Data collection

The collection of objective data was coordinated by WP5 (execution) and involved WP3 (implementation), WP4 (setup) and WP5 (evaluation). The collected objective data was used for multiple purposes: For instance, in WP5 it was used for monitoring the project's execution and status of the MyWay platform in real-time. This enabled the instant detection of problems which could be quickly mitigated in order to improve user experience. Objective data was used to calculate the MyWay response time, the frequency of unexpected behaviour by the software, number of application downloads and frequency of use by each user. When authenticated users activated the Trip Follower, additional data was collected for calculating indicators that reveal objectively how well MyWay meets expectations, e.g. if users follow the 1st or 2nd ranked suggestion, as well as what modes they actually used.

Subjective users' perceptions and estimations were collected using the Subjective Evaluation Questionnaire (SEQ). This questionnaire was completed at three time points along

Phase 2, that were selected so as to split the Phase 2 tests of MyWay in equal time intervals. SEQs were also completed at the end of the Pre-phase and twice during the Phase 1 tests. The users' self-reported real usage of transportation means was also collected via travel diaries. The users' initial opinions and mobility patterns were collected via a background questionnaire and a background travel diary, which were completed before the users joined the evaluation activities.

2.4 The sample

A total of 371 users registered in the MyWay portal and completed the background and subjective evaluation questionnaires, although not all of them completed all four required questionnaires. Their gender and age distribution are shown in Table 1.

Table 1. Number of users by age group and gender

Age group by year of birth	Total	Gender Male	Gender Female	Gender Missing
1990-1999	70	45	25	0
1980-1989	122	76	46	0
1970-1979	100	56	44	0
1960-1969	43	26	17	0
<=1959	14	10	4	0
Age Missing	22	0	1	21
TOTALS	371	213	137	21

The distribution of registered users per platform is depicted in Table 2. There were more Android users (234) than iOS users (132).

Table 2. Number of users by platform and gender

Platform	Total	Gender Male	Gender Female	Gender Missing
Android	234	136	87	11
iOS	132	75	49	8
Platform missing	5	2	1	2
TOTALS	371	213	137	21

The distribution of registered users per target group category is depicted in Table 3. The table includes also those users who responded to the relevant question. The majority of registered users were "working" persons (129), while fewer users came from the other categories. For example, only 2 people declared themselves as "retired" and only 9 as ">=55".

Table 3. Total number of users in each target group category

Target User Group	Total	Gender Male	Gender Female	Gender Missing
Student	47	36	11	0
Working	129	77	52	0
Retired	2	1	1	0
Missing	18	3	3	12
unemployed	7	4	3	0
>=55	9	6	3	0
TOTALS	212	127	73	12

The completed questionnaires and travel diaries per Living Lab are shown in Table 4. The number of travel diaries was very limited so as to extract valuable information about actual usage of transportation means by users. The diary was re-designed after the findings of the first two phases of evaluation and more efforts were made to convince the users to complete it. The same holds true for the SEQs. They were simplified and shortened according to the results of the first two phases of evaluation, reminders were sent to the users to complete them and incentives were given to motivate users to participate. Despite the changes made and the additional efforts, the target number of completed questionnaires could not be collected. This is presented and explained in Deliverable 5.3, Living Lab Executions report, Final version.

Table 4. The sample of SEQs in Phase 2 and travel diaries

SEQs	Background	SEQ1	SEQ2	SEQ3
Catalonia	116	85	65	62
Berlin	54	22	13	13
Trikala	34	23	23	23

Travel Diaries	Initial	Final
Catalonia	20	25
Berlin	2	0
Trikala	7	33

15 users completed the SEQ at the end of the Pre-phase and 46 users completed it at the end of Phase 1.

Users reported having access currently to various competitive services, like Google Maps, TomTom, Mou-te, other smartphone apps (maps, Waze, Sygic, gencat, Viamichelin,...), BVG online as trip planner, Vull anar, Sygic, Garmin, iPhone APP maps, CoPilot Premium, GPS Smartphone, Car GPS system, Navigon and Android phone.

2.5 Analysis

Two-sample t-tests and z-tests have been used to analyse objective variables. Although the Kolmogorov-Smirnov tests revealed that the underlying distribution of the considered data is not normal, according to the Central Limit Theorem the mean of independent and identically distributed observations is approximately normally-distributed provided that their sample size is sufficiently large i.e. larger than 30, which is the case in this analysis.

The responses to Likert scales in the Subjective Evaluation Questionnaires have been coded in a -2 to +2 scale, where -2 is the worst and + 2 the best rating, while 0 is the neutral rating. Then, for each question the weighted average of responses has been calculated for all responses.

To conduct statistical analysis, the weighted average of responses by users who answered the background and all three SEQs were analysed separately. 61 persons in Catalonia, 11 in Berlin and 23 in Trikala responded on all three questionnaires. Wilcoxon Signed-Rank tests were used to check for statistically significant differences between responses per time point.

When the analysis referred to technical performance and usability of MyWay, the responses by users of Android and iOS platforms were separately analysed, so as to evaluate if there were specific issues per platform.

3. TECHNICAL EVALUATION

3.1 Actual technical performance

3.1.1 Response time

A first objective of the evaluation work was to analyse the technical performance of MyWay as regards its response time. The trip plans requests logged by the application in the period 25 August 2015 to 31 December 2015 have been analysed. Only those requests which returned a trip plan (having an “OK status”) have been analysed. Each user’s trip request to the MyWay was resulting in queries to the metaplanner and for plan refinement to the linked subplanners, as appropriate. In some cases one user’s request could result in multiple requests to the same subplanner, with different queries to refine different trip legs in different trip plans. The median and mean response times of MyWay, of the Metaplanner and of the subplanners, are presented in Table 5, together with the standard deviation and 75 and 95 percentiles.

Outliers were defined as those requests the response time of which deviated more than four times the standard deviation of the sample, these have been excluded from the analysis. Such outliers could be attributed to temporal technical issues with the sub planners or the servers at specific time points. Outliers were detected as regards the Superhub subplanner, the Metaplanner in all three LLs and the MyWay in Catalonia only.

In all cases, the MyWay and Metaplanner response times were longer than the response time by each specific sub-planner (Superhub – MyWay: $p = 1.9 \cdot 10^{-175}$, MouTe – MyWay: $p = 0$, OTP Catalonia implementation – MyWay: $p = 0$, VMZ – MyWay: $p = 2.6 \cdot 10^{-50}$, OTP Trikala implementation – MyWay: $p = 5 \cdot 10^{-27}$). This was expected since both the MyWay and Metaplanner query the sub planners and conduct some further processing in the sub-planners results.

The response time of the Metaplanner in Catalonia was higher than in Berlin (mean 13.8 s versus 7.1 s, $p = 8.7 \cdot 10^{-14}$) and both were higher than in Trikala (mean 0.1 s, $p = 5.9 \cdot 10^{-48}$ and $p = 0$ respectively). This may be due to the size of the area covered, for example in Catalonia there were many trips more than 100 km long. Other factors could be the number of subplanners being queried in the different Living Labs and the number of modes being integrated, for example if there were a lot of connections. The MyWay mean response time was lower than the Metaplanner’s in Catalonia (10.6 s versus 13.8 s, $p = 1.4 \cdot 10^{-13}$), while it was higher in Berlin (9.2 s versus 7.1 s, $p = 8.1 \cdot 10^{-14}$) and in Trikala (0.18 s versus 0.14 s, $p = 3.9 \cdot 10^{-5}$). MyWay has a timeout threshold of 30 s in which the user is presented with a NO PLANS response, while the subplanner and Metaplanner have their specific timeout sets.

Table 5. MyWay and Metaplanner response time per LL

Living lab		Number of requests with "OK" status	Median response time (ms)	Mean response time (ms)	Standard deviation response time (ms)	75 percentile response time (ms)	95 percentile response time (ms)
Catalonia	Superhub	10636	210	576	2,983	301	1,078
	Mou-te	28751	2202	4,157	5,220	4169	16,759
	OTP_bike	10721	64	125	173	118	463
	OTP_car	24680	139	153	119	197	337
	MyWay	7301	5020	10,551	16,496	9,006	40,837
	Metaplanner	6766	4584	13,818	33,575	8,631	57,208
Berlin	VMZ	2135	4281	5,795	4,120	7,969	13,139
	MyWay	1858	6152	9,172	9,317	9,923	30,069
	Metaplanner	1405	6147	7,109	5,061	8,679	152,285
Trikala	OTP	4089	51	97	230	87	334
	MyWay	1535	116	181	323	173	453
	Metaplanner	1293	103	143	108	142	396

3.1.2 Following MyWay suggestions

The total number of all started trip following requests per LL is depicted in Table 6, which correlates with the user clicking the «Trip Following» icon in the frontend application. The data logged by the application in the period 25 August 2015 to 31 December 2015 have been used for the analysis. To further investigate the actual usage of the TripFollowing functionality and the following of MyWay suggestions, the column «TripFollowing used» in Table 6 refers to trips where the time followed was over 3 minutes, which signifies that the user has been really followed. The final column presents the total requests by authenticated users per LL, this is an upper limit for TripFollowing requests, since users have to be logged in order to use the TripFollowing functionality. This table shows that the real trips in which the TripFollowing was active were limited. Discussions with users revealed that there were some issues with the TripFollowing functionality. It was mentioned that it stopped when the GPS signal was lost, for example in tunnels or in the metro, and users were not eager to re-activate it, as this required time and effort from them. Moreover, in

some cases users did not consider this functionality useful, for example when they were already embarked on a bus or while driving their own car. These are possible causes why the frequency of using the TripFollower becomes less per time point in Catalonia and Berlin (Table 7).

Table 6. TripFollower usage per LL

Living Lab	# TripFollowing started	# TripFollowing used	# Authenticated trip requests
Catalonia	1099	770	2544
Berlin	455	386	1069
Trikala	178	139	463

Due to the limited usage of the TripFollowing functionality, the results on users following the MyWay suggestions, as shown in Table 7, only have a limited representativeness with respect to user behaviour. In all LLs and time periods, the percentage of users who used the TripFollowing functionality and selected the first or second MyWay suggestion was over 60%, with the only exception being the second time period for Trikala. The significance of the results was tested using 2-sample z-tests. The tendency to select the first or second MyWay suggestion seems to increase with time. In all three LLs, the percentage of users selecting the first or second MyWay suggestion was higher in the third time period than in the first, in Catalonia and Trikala this difference was significant, 75.8% versus 61.8% in Catalonia ($p=0.0057$) and 75.5% versus 66.6% in Trikala ($p=0.0462$). In Berlin the result is not significant even though the percentage increased, probably because the number of incidences of TripFollowing fell sharply between TP-2 and TP-3, 93.7% versus 78.6% in Berlin.

Table 7. Selection of MyWay suggestions per LL

	Time point	N (TripFollowing used)	1 st MyWay suggestion selected	2 nd MyWay suggestion selected	Overall Percentage (1 st and 2 nd suggestion)
Catalonia	TP-1	430	143	123	61.8%
	TP-2	228	84	59	62.6%
	TP-3	112	53	32	75.8%
Berlin	TP-1	211	106	60	78.6%
	TP-2	143	39	55	65.6%
	TP-3	32	20	10	93.7%
Trikala	TP-1	15	4	6	66.6%

	TP-2	34	5	1	17.6%
	TP-3	90	49	19	75.5%

3.1.3 MyWay exceptions

The number of requests which resulted in an “exception” response by MyWay was very low as shown in Table 8. The trip plans requests logged by the application in the period 25 August 2015 to 31 December 2015 have been analysed. There were only 0.2% of requests resulting in exception in Catalonia and no such case in the other two Living Labs. This table also presents the number of requests in which a “NO plans” response was received. This response corresponds to a request in which no plan could be calculated. Although this is not an exception but may be due to non-availability of a plan covering the users’ request and preferences at the specific time point of request, these responses have been also analysed.

Table 8. MyWay exceptions

LL	Total plans	Plans OK	NO plans	Exceptions
Catalonia	7356	6791 (92.33%)	550 (7.48%)	15 (0.2%)
Berlin	1798	1417 (78.81%)	381 (21.19%)	0
Trikala	1432	1296 (90.5%)	136 (9.5%)	0

The exceptions per subplanner are shown in Table 9. The case of Catalonia clearly depicts the added value of MyWay, since the MyWay exceptions were lower (0.2%) than the exceptions of each separate subplanner.

Table 9. Sub planners’ exceptions

Living Lab	Sub planner	Total plans	Plans OK	NO plans	Exceptions
Catalonia	Superhub	22197	10675 (48.09%)	10725 (48.32%)	188 (0.85%)
	Mou-te	33646	28671 (84.92%)	9.54 (2.84%)	563 (1.67%)
	OTP_car	24680	23480 (95.14%)	889 (3.6%)	4 (0.016%)
	OTP_Bike	11282	10721 (95.03%)	441 (3.91%)	0
Berlin	VMZ	3150	2135	628	45 (1.43%)

			(67.78%)	(19.94%)	
Trikala	OTP	4734	4089 (86.38%)	630 (13.31%)	0

It should be noted that for one trip request there could be multiple requests to the subplanners, this is why the number of total plans in the table below is bigger than the number of plans provided by MyWay, as depicted in the previous table. This is also the reason why the MyWay exceptions in Berlin are lower than those by VMZ, because for each request to MyWay there were multiple different requests to VMZ, since a single request has been issued for each transport mode.

3.1.4 Evaluation of the Metaplanning approach

The Metaplanning approach to trip planning is a MyWay innovation. The Metaplanning allows proposing a fully intermodal trip plan and this can be done with reduced reliance on detailed data about all transport modes.

Two types of evaluation have been conducted. At first, a high-level evaluation of the Metaplanning approach was conducted, using synthetic origin-destination pairs for all three LLs. Then, a more detailed analysis was conducted for the Catalonia LL, using real origin-destination pairs. The evaluation was performed for the Catalonia region, because this region has the biggest potential for intermodal journey planning due to its diverse geography, the largest number of transport modes and available subplanners. Another reason was that in Catalonia, there was also the largest number of trip plan requests, compared to Berlin and Trikala LL. By evaluating real trip plan requests and responses, the benefits of Metaplanning for the real users can be inferred.

Evaluation using synthetic origin-destination pairs

For each LL, 1000 random origin-destination pairs were generated. To simulate real demand, a randomly generated origin-destination request was accepted for evaluation with the probability defined in Table 10. A full area of the LL was used as a bounding box.

Table 10. A lookup table for computing acceptance probability given origin-destination distance.

Origin-destination distance [km]	Acceptance probability
< 10	1
10–20	0.5
20–30	0.3
30–40	0.1
> 40	0

The single-modal plans were provided by single-modal subplanners available in the respective LLs.

To evaluate the advantages offered by the Metaplanner, the intermodal plans returned by the Metaplanner were divided into three groups based on how they compare to single-modal plans for the same origin and destination according to three evaluation criteria, travel time, price and emissions.

The values of the criteria values were calculated for both the intermodal and the single-modal trip plans using the methods defined below. Firstly, the duration of the trip was calculated based on the answers of individual subplanners. Secondly, a simplified model was used to calculate price, as defined in Table 11. Thirdly, to measure the environmental impact of trips, on-trip emissions for each trip plan were calculated, using a simplified model based on the distance travelled and CO₂ values presented in Table 12.

Table 11. Overview of the simplified price model.

Mode of transport	Price calculation formula
Walk	0€
Bike	0€
Shared bike	first 30 min free, each following 30 min 0.5€
Shared electric scooter	0.55€ per km
Bus	each 75 min costs 2.10 € (single ride ticket)
Bus on demand	
Tram	
Metro	
Train	1€ per 10 km, minimum fare 3 €
Car	0.43€ per km
Taxi	get on 2€, 1.10€ per km, minimum fare 7€

Table 12. Grams of CO₂ produced by different modes of transport per km per person.

Mode of transport	Grams of CO ₂ produced per km per person
Walk	0
Bike	0
Shared bike	0
Shared electric scooter	0

Bus	73
Bus on demand	73
Tram	0
Metro	0
Train	0
Car	192
Taxi	192

The intermodal plans were divided into three groups.

The first group, denoted as **Dominating**, contained the intermodal plans that were strictly better than the corresponding best single-modal plan in at least one of the evaluation criteria and which were not worse in any of the remaining two criteria.

The second group, termed **Pareto**, contained those intermodal trip plans that were not dominated by any single-modal plans. Such plans reside on a frontier of Pareto optimum solutions – they were neither better nor worse than single-modal plans and they thus provided different trade-offs between the three criteria considered than single-modal plans. Such alternative plans could for example provide longer travel times than the fastest single-modal option but for a lower price or emissions.

Finally, the **Dominated** group contained intermodal trip plans that were dominated by at least one single modal plan.

The results are presented in the following. . In the three LLs, the intermodal approach could find intermodal plans that dominated single-modal plans in 4% to 12% of requests. The majority of intermodal trip plans (between 85% and 92%) fell in the Pareto group and were therefore extending the travel options available to the user. There was only a small group of Dominated intermodal plans.

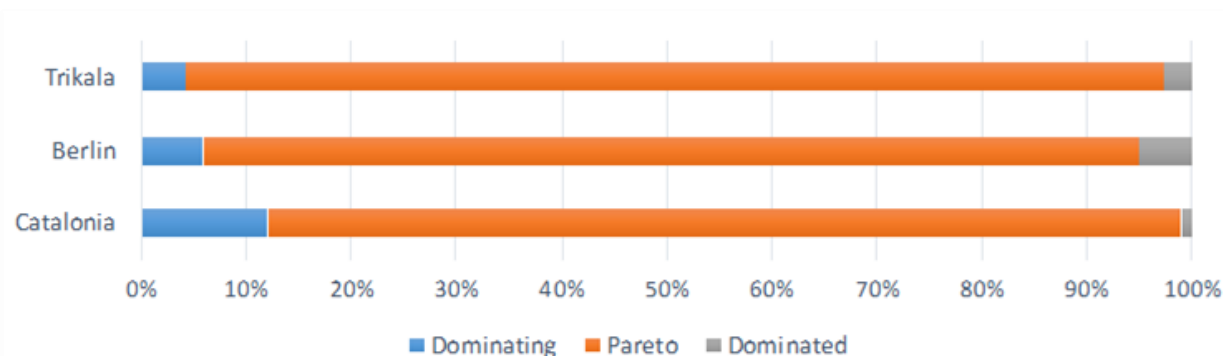


Figure 1. Comparing intermodal plans with single-modal plans for the same trip request

Another advantage of the Metaplaning approach is that it can propose intermodal plans in which the first and/or the last mile of the trip is via private transport mode, while the core of the trip is still carried out by public transport. So, it proposes public transport for routes for which there are no public transport-only connections and the user would need to rely on a private transport mode, most likely car, for the whole trip. With intermodal planning, the user has the option to use public transport for most of his/her trip, thus reducing cost and saving emissions.

Analysing the randomly generated trip requests (), there were between 17%-32% origin-destination pairs for which the Metaplanner did propose an intermodal plan with public transport.

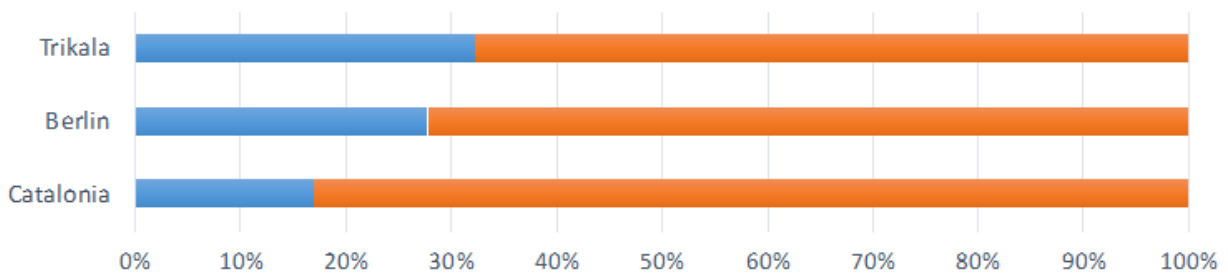


Figure 2. Percentage of journey responses offering only intermodal PT (blue)

Evaluation using real origin-destination pairs in Catalonia

This analysis was based on 6790 real trip plan responses that were returned by the Metaplanner during the Phase 2 trials in autumn 2015, having an OK status code in the Catalonia LL. The distribution of the direct origin-destination distances is shown in Figure 3. The single-modal plans that were used as basis for the comparison were returned by individual subplanners in Catalonia, Moute for public transport, Superhub for bike-sharing and OpenTripPlanner for bike and car trips.

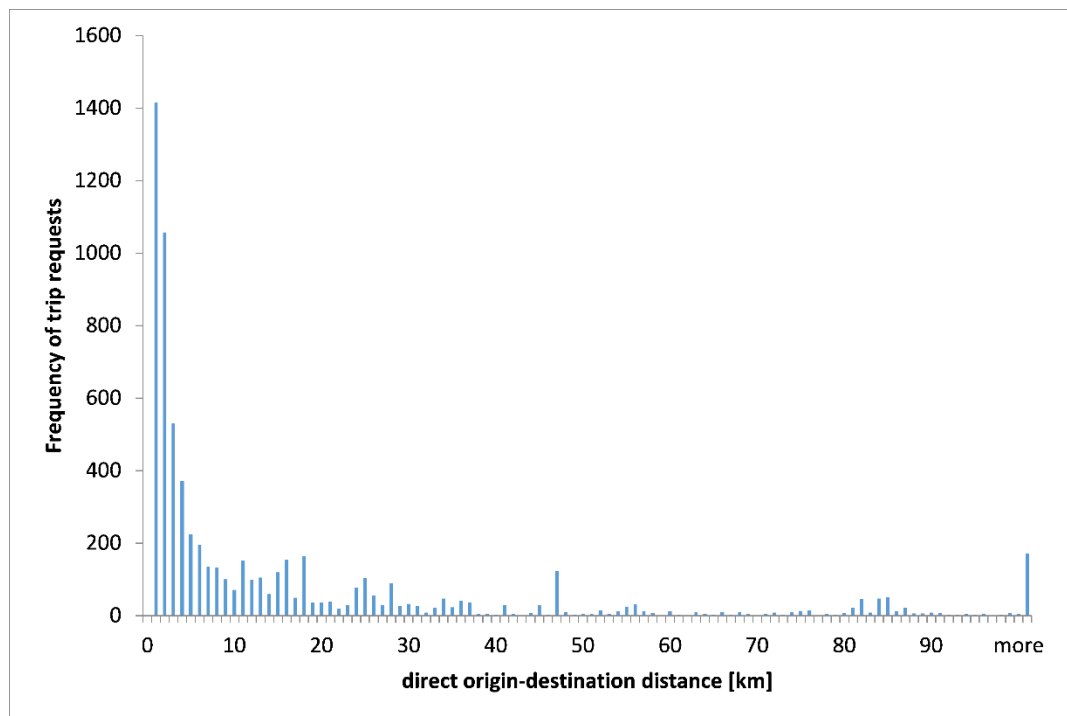


Figure 3. Histogram of direct origin-destination distance for real trip requests in Catalonia LL.

Overall, there were 1361 trip plan responses (20%) in which the subplanners did not return a public transport only trip plan. In 404 cases of them (30%), the Metaplanner did return a non-dominated intermodal trip plan from the origin to the destination (e.g., including bike and train). This shows that the metaplanner is able to return intermodal proposals, in cases when a specific subplanner cannot return one.

To analyse the benefits of the intermodal journey planning, the number of non-dominated extra intermodal options offered on average for each trip plan request were analysed. When considering all trips, there were on average 0.4 non-dominated extra intermodal options. Considering only long trips, those with a duration above 60 minutes, there were on average 0.9 non-dominated extra intermodal options. To summarize, the Metaplanner does return non-dominated extra intermodal options, especially for trips longer than 60 minutes.

In addition, the durations of the public transport only and intermodal trip plans were compared. 2543 of the real trip plans were used for this, in which cases both types of trip plans had been returned. For these trips, the intermodal trip plans had shorter duration than public transport only trip plans, leading to an average speed up due to the intermodal plan of 20%.

To conclude, both synthetic and real origin-destination pairs were used to evaluate the potential of the Metaplanning approach. The results show that the Metaplanner is able to help in cases where there is no public transport-only plan provided by single subplanners. The Metaplanner can offer non-dominated extra intermodal options, especially for longer trips, which means that the user can use, for example, bike and train instead of car for the whole journey. Furthermore, the Metaplanner can deliver intermodal trip plans with no-

ticeably shorter duration than public transport only plans. 3.2 Perceptions on technical performance

The users' responses in each of the three Subjective Evaluation Questionnaires per Living Lab to the question "How do you evaluate the MyWay response time (compared to other planners)?" are shown in Table 13.

Table 13. Perceptions about MyWay response time (-2: Very slow / Much slower, +2: Very quick / Much quicker)

		All users		Same users		Android users		iOS users	
Living lab	Time point	N ¹	Weighted Average	N	Weighted Average	N	Weighted Average	N	Weighted Average
Catalonia	SEQ-1	85	-0.22	61	-0.16	64	-0.19	21	0.07
	SEQ-2	65	-0.15	61	-0.13	51	-0.21	14	0.14
	SEQ-3	62	-0.05	61	-0.08	48	-0.13	14	0.07
Berlin	SEQ-1	22	-0.36	11	-0.18	16	-0.25	6	0.00
	SEQ-2	13	-0.38	11	-0.27	9	-0.75	4	0.99
	SEQ-3	13	-0.31	11	-0.36	10	-0.75	3	0.66
Trikala	SEQ-1	23	0.13	23	0.13	10	0.30	13	0.07
	SEQ-2	23	0.26	23	0.26	10	0.50	13	0.07
	SEQ-3	23	0.13	23	0.13	10	0.40	13	-0.07

In general, the users' responses were consistently very close to the neutral rating (0: the MyWay response time is the same as other commercial planners), meaning that they perceived MyWay as comparable to the other commercial planners they are currently using. It must be noted that users mentioned that in the period when the MyWay evaluation activities were conducted they were using mature planners like Google Maps, TomTom, Mou-te or Sygic. Users in Catalonia perceived MyWay as of similar speed as the other commercial mature planners they were using. In the first time point the weighted average of their responses is -0.22, while in the third time point it is -0.05. The same holds true for Berlin, although the weighted average is a bit lower than in Catalonia (-0.36 in first time point and -0.31 in the third time point), and for Trikala, where the weighted average of responses is higher, 0.13 in first and third time points. Users' perception did not change with time, as the Wilcoxon signed-rank test did not detect any difference between responses of the "Same users" per time point. No difference between the responses by Android and iOS users was also found.

¹ In all tables analysing responses in the SEQs, N refers to the number of completed SEQs analysed.

The users' responses to the question "How reliable is the information provided by MyWay (compared to other planners)?" are shown in Table 14. Users in Catalonia perceived it of similar reliability to the information provided by other commercial planners, the weighted average of their responses in the third time point is 0. The same was true for Berlin, although a bit more positive, the weighted average of responses in the third time point was 0.15. Users in Trikala perceived the information provided by MyWay as rather (more) reliable, the weighted average of responses ranged from 0.48 to 0.52. Again no difference between time points in the sample of the "Same users" responses was found by the Wilcoxon signed-rank test.

Table 14. Perceptions about the reliability of information provided by MyWay (-2: Very unreliable / Much less reliable, +2: Very reliable / Much more reliable)

		All users		Same users	
Living lab	Time point	N	Weighted Average	N	Weighted Average
Catalonia	SEQ-1	85	0.11	61	0.13
	SEQ-2	65	-0.17	61	-0.16
	SEQ-3	62	0.00	61	-0.03
Berlin	SEQ-1	22	0.05	11	0.09
	SEQ-2	13	-0.08	11	0.00
	SEQ-3	13	0.15	11	0.09
Trikala	SEQ-1	23	0.48	23	0.48
	SEQ-2	23	0.52	23	0.52
	SEQ-3	23	0.52	23	0.52

The users' responses to the question "Are the MyWay suggestions (more) in accordance to your needs and expectations (than the suggestions by the other planners)?" are shown in Table 15. Again, in general the users' responses were close to the neutral rating (0: the MyWay recommendations were in accordance to their needs and expectations as those by other commercial planners). In Catalonia the weighted average of responses ranged from 0.07 to 0.09. In Berlin the weighted average of responses ranged from 0.08 to 0.46 in the third time point. In Trikala the users initially perceived the information as rather (more) reliable, the weighted average in the first time point was 0.46, but in the third time point this became negative (-0.26). The results should be interpreted with caution, since no difference between time points in the sample of the same users' responses was found and overall numbers are very low.

Table 15. Perceptions about the accordance of MyWay suggestions to their needs and expectations(-2: Not at all / Much less, +2: Definitely yes / Much more)

		All users		Same users	
Living lab	Time point	N	Weighted Average	N	Weighted Average
Catalonia	SEQ-1	85	0.07	61	0.08
	SEQ-2	65	0.09	61	0.13
	SEQ-3	62	0.09	61	0.07
Berlin	SEQ-1	22	0.09	11	0.36
	SEQ-2	13	0.08	11	0.18
	SEQ-3	13	0.46	11	0.46
Trikala	SEQ-1	23	0.09	23	0.09
	SEQ-2	23	-0.26	23	-0.26
	SEQ-3	23	-0.17	23	-0.17

To further investigate whether and how the MyWay suggestions match the expectations of local users, a comparative analysis of the results obtained by different trip planners for the same searches was conducted by the Generalitat de Catalunya (GENCAT) in the Catalonia Living Lab. The trip planners were MyWay and three mature trip planners already in the market, namely Mou-te for smartphone, TMB App and Google maps. The results by each of these trip planners for specific searches, were compared with the preferences and suggestions by a local user for the specific trip.

The searches have been done using smartphones with Android operating system as this was the most common in the GENCAT organisation. The points of origin and destination for each search included in the analysis have been chosen by several users employed in GENCAT, who are familiar with the itinerary for each trip and are aware of the most efficient way to make the trip using public transport or other private transport modes. Different ranges of trips have been considered in the analysis. They included trips within urban areas or within the metropolitan area of Barcelona and trips extending to a wider area from the whole Catalonia (including different municipalities). The detailed results of this analysis are included in Annex 2. The MyWay suggestions always included the itinerary which was suggested by the local users as the optimum one, ranked first among the proposed routes. This was not always the case for the other three trip planners, showing that MyWay has a promising market potential.

The users' responses to the question whether they have encountered any unwanted behaviour by MyWay are depicted in Table 16. The perceived frequency of unwanted behaviour seems to reduce with time in Catalonia, 51.7% users answered yes in the first questionnaire while 40.3% in the third questionnaire. Similarly, in Berlin 50% of users responded positively in the first questionnaire while 38.4% did so in the third. In Trikala, the situation is the opposite, 8.6% of users responded yes in the first questionnaire and

17.3% in the third. No differences per time point in each LL were found for the sample of “Same users”. No difference between iOS and Android users’ responses was found.

Table 16. Perceptions about MyWay unwanted behaviour

		All users		Same users		Android users		iOS users	
	Time point	N	Yes	N	Yes	N	Yes	N	Yes
Catalonia	SEQ-1	85	51.7%	61	55.7%	64	48.4%	21	61.9%
	SEQ-2	65	58.4%	61	59.0%	51	58.8%	14	57.1%
	SEQ-3	62	40.3%	61	40.9%	48	37.5%	14	50%
Berlin	SEQ-1	22	50%	11	54.5%	16	50%	6	50%
	SEQ-2	13	30.7%	11	27.2%	9	33.3%	4	25%
	SEQ-3	13	38.4%	11	45.4%	10	50%	3	0%
Trikala	SEQ-1	23	8.6%	23	8.6%	10	0	13	15.3%
	SEQ-2	23	21.7%	23	21.7%	10	20%	13	23.0%
	SEQ-3	23	17.3%	23	17.3%	10	10%	13	23.0%

The users’ responses to the question “Were any encountered problems more frequent than that of other planners” are shown in Table 17. The results should be interpreted with caution, since no difference between time points in the sample of the same users’ responses was found. Users in all Living Labs perceived the problems as almost the same as those of other commercial planners, since the weighted average of responses ranges between -0.27 and 0.35, meaning it is very close to the neutral rating 0. This means that the encountered problems were as frequent as that of other planners.

Table 17. Perceptions about frequency of MyWay unwanted behaviour (-2: Definitely more frequent, +2: Much more rare)

		All users		Same users		Android users		iOS users	
	Time point	N	Weighted average	N	Weighted average	N	Weighted average	N	Weighted average
Catalonia	SEQ-1	81	-0.21	59	-0.34	64	-0.15	21	-0.45
	SEQ-2	63	-0.24	59	-0.5	51	-0.48	14	-0.38
	SEQ-3	60	-0.3	59	-0.57	48	-0.31	14	-0.38
Berlin	SEQ-1	22	-0.27	11	-0.45	16	-0.08	6	-0.66
	SEQ-2	13	-0.23	11	-0.18	9	-0.22	4	-0.25

	SEQ-3	13	-0.07	11	-0.09	10	-0.52	3	0.33
Trikala	SEQ-1	20	0.35	14	0.35	10	0.28	13	0.23
	SEQ-2	20	0.1	14	0.57	10	0.4	13	0.00
	SEQ-3	20	-0.05	14	0.57	10	0.25	13	-0.5

As presented in Deliverable 5.3, there were some exceptions of MyWay in the beginning of October 2015 in Catalonia and some problems to connect to the subplanners in Berlin and Trikala, also in the beginning of October 2015. The feedback received by users on the dates of the problems, which is relevant to the encountered problems, was:

- I cannot create a new user
- I cannot save my preferences
- I do not see the description of the journey (mentioned 3 times)
- It does not show the simple trip, using only metro from Fontana to Sants
- I was invited to reschedule without any sense
- I'm on the train from Villefranche to saints and it tells me I need to reschedule. I do not know how, because the alternative is obviously worse because I'm on the train
- The search for railway stations or larger squares is problematic. The list of routes should include the number and not only that there is a railway line.

The main problems, as perceived by the users, were inability to register and save their preferences, the non display of the trip details and the request to re-schedule without an apparent reason for the users,

The users' responses to the question "Do you think that the same trips when done following MyWay advice lasted less than when not using MyWay?" are shown in Table 18. No significant differences were found between time points in each Living Lab. Users in all LLs responded that similar trips lasted the same, the weighted average of responses ranged between 0.1 to 0.22 in Catalonia, 0.40 to 0.53 in Berlin and 0.08 to 0.13 in Trikala.

Table 18. Perceptions about trip duration when following MyWay advice (-2: Definitely lasted more, +2: Definitely lasted less)

		All users		Same users	
Living lab	Time point	N	Weighted Average	N	Weighted Average
Catalonia	SEQ-1	85	0.10	61	-0.01
	SEQ-2	65	0.01	61	0.06
	SEQ-3	62	0.22	61	0.19

Berlin	SEQ-1	22	0.40	11	0.54
	SEQ-2	13	0.53	11	0.54
	SEQ-3	13	0.46	11	0.45
Trikala	SEQ-1	23	0.13	23	0.13
	SEQ-2	23	0.08	23	0.08
	SEQ-3	23	0.13	23	0.13

4. USABILITY EVALUATION

4.1 Results from Scripted Journey Plan Tests

The Scripted Journey Plan (SJP) tests were designed between WPs 1 and 5 to supersede the Expert Usability Evaluations. They came about as an outcome of responding to reviewers' comments following the Year 1 review that the overall number of scenarios produced for the initial focus groups (requirements gathering) was too many for evaluation purposes. In the process of refining the existing scenario set (presented in Deliverable 1.1), it was agreed that the subset should focus on illustrating the innovative Phase 2 functionality, the revised set is reported in Deliverable 1.4 [MyWay D1.4]. The results of these tests are presented as a supplement to the user acceptance and socio-economic evaluation.

The Final Set of Scripted Journeys scenarios is given in Table 19.

Table 19. Scripted Journey Plan Tests per LL

Living Lab	Scenario	Description
Berlin	B1	Public transport instead of bike in bad weather (student)
	B2	Car-pooling
	B3	A dissatisfied car commuter
Catalonia	C2	Public transport instead of bike in bad weather (student)
	C4	Finding parking places
	C5	A dissatisfied car commuter
Trikala	T1	Public transport instead of bike in bad weather (student)
	T2	Finding parking places
	T3	A dissatisfied car commuter

The methodology for the SJPs was reported in Deliverables 1.4 [MyWay D1.4] and 5.2 [MyWay D5.2] and the conduct of the tests in each Living Lab was confirmed in Deliverable 5.3 [MyWay D5.3]. The purpose of the SJP tests was to gather in-depth data from a small number of users about their experience of using MyWay to create journey plans conforming to specific scenarios. The results gave more insight into problems that the real users may have been experiencing in the Living Labs. Analysis of the user reports prepared to a common format enabled the consortium to focus on solving any significant issues that may have arisen, as well as giving some quantifiable results on the closeness of the match between scenario and journey plans offered. A total of 47 SJPs were carried out by 26 testers (Table 20). In this analysis, for all the questions that were asked as a Likert-type scale, 1 equals the most positive response and 5 is the least positive response.

Table 20. Matrix of Scripted Journey Plan tests carried out by Living Lab (reproduced from D5.3, Table 10)

Living Lab	# testers	# scenarios	# templates
Berlin	8	3 (1, 2, 3)	11
Catalonia	9	3 (2, 4, 5)	27
Trikala	9	3 (1, 2, 3)	9

Figure 4 below shows the age profile of the testers that were recruited for the task. These age profiles are similar to those of the real users in each Living Lab. For example, the Berlin Living Lab is focused largely on students as the target group, and this reflected in the SJP tester age profile.

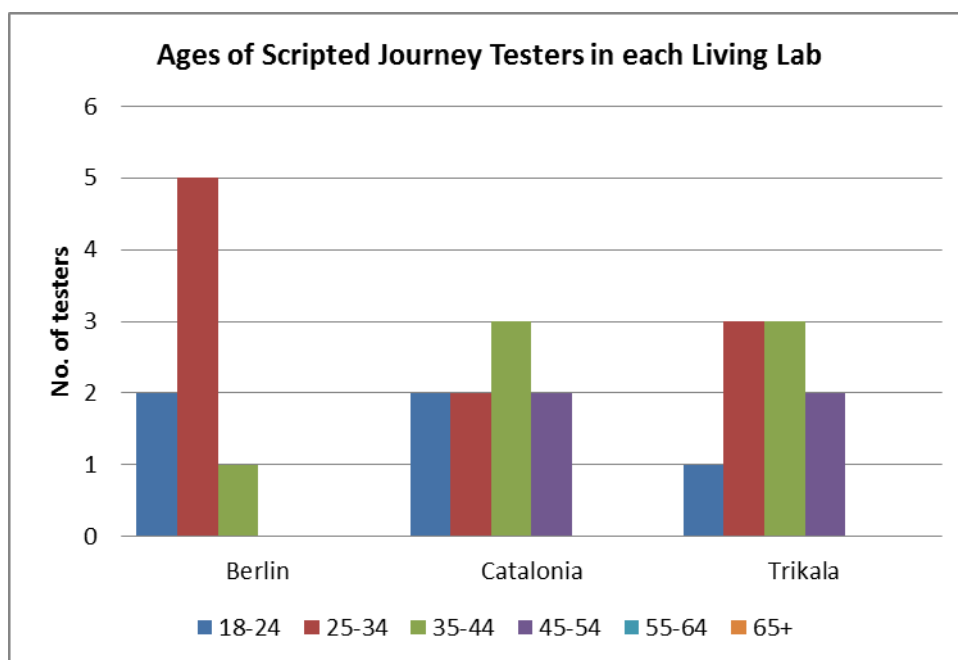


Figure 4. Age profile of Scripted Journey Plan Testers across the Living Labs

Figure 5 shows the gender breakdown of the SJP testers. It can be clearly seen that fewer women were recruited to perform the SJP tests. This can be compared to the overall gender profile of real users in each Living Lab by referring to Section 2, where it can be seen that it is approximately the same.

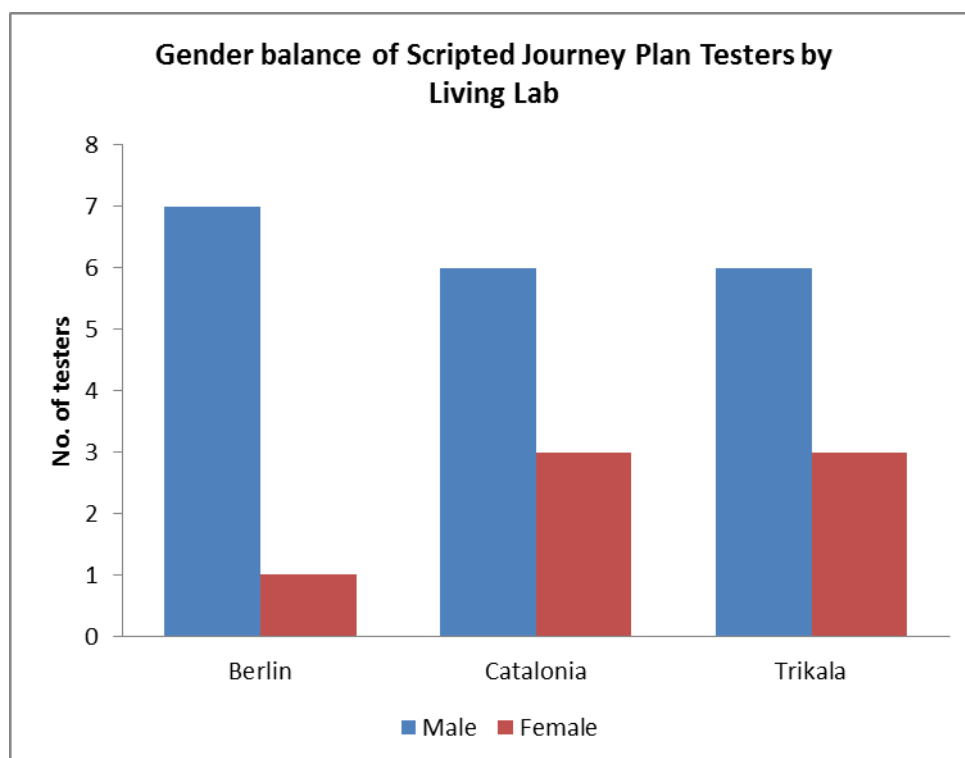


Figure 5. Gender Balance of the Scripted Journey Plan Testers by Living Lab

The SJP testers were a mix of Android and iOS users. The breakdown by the total number of scenarios tested is shown in Figure 6, for each Living Lab.

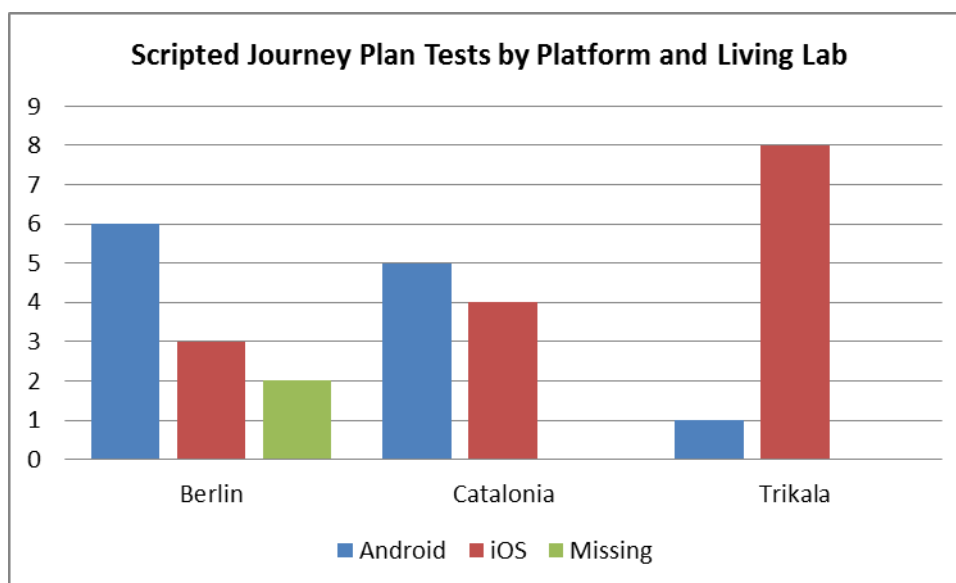


Figure 6. Scripted Journey Plan Tests by Platform and Living Lab

The first set of questions dealt with the research question, whether MyWay can produce results which match the scenarios and which are as expected by users.

The mean ratings in the question “Did MyWay find a journey plan that matched your expectation in relation to the scenario?” are shown in Table 21. The best results have been obtained in Catalonia, which has the highest mean ratings for each scenario, and also the highest number of tests carried out. Berlin’s results are more variable, and the two testers for scenario B2 (car-pooling) appeared to experience more problems than other testers. In Trikala, there were only three tests per scenario, and the results are therefore not very conclusive. However, the number being nearer 3 than 2 suggests that the expectations of the Trikala testers were only partially met. If one takes the mean results for each Living Lab, and then calculate a weighted mean average (weighting based on the number of tests carried out), the overall rating is 2.08. This suggests that overall the testers found that the journey plans ‘mostly’ met their expectations and is a good result. The best results were achieved in Catalonia, with a mean rating of 1.54 across all the scenarios.

Table 21. Ratings of journey plans as matching testers’ expectations (1: Completely, 5: Not at all)

	Berlin			Catalonia			Trikala		
	B1	B2	B3	C2	C4	C5	T1	T2	T3
N	6	2	3	9	9	9	3	3	3
Mean rating	2.00	4.50	2.67	1.67	1.50	1.44	2.67	2.67	2.67
Mean (all scenarios)	2.64			1.54			2.67		
Weighted mean	2.08								

The responses in the question “How high up the list of journey plan suggestions was the plan that best matched the scenario?” are shown in

Table 22. The results were very good in Catalonia, with 20 out of 27 tests resulting in journey plans which best matched the scenario being in the top two suggested journey plans. Results are also acceptable in Trikala. However, the results in Berlin were a lot more variable, with more than half of the tests failing to have a matching plan in the top two, and one null result.

Table 22. Ranking of best matching scenario)

	1st	2nd	3rd	Below 3 rd	Absent
Berlin	3		2	5	1
Catalonia	11	9	5	2	
Trikala	2	5	2		

In order to better understand their ratings, testers were asked to describe the ways that journey plans failed to meet their expectations. A range of comments were received, these were coded and have been grouped as shown in Table 23.

Table 23. Frequencies and Categories for the ways in which testers' felt that journey plan results did not meet their expectations.

Issue	Frequency		
	Berlin	Catalonia	Trikala
Time to get response too long	3	1	
Inaccurate or Missing locations/stations	1	1	3
Preference setting limitations and usability	2		
No plans at all/Out of area messages	2	1	4
Inaccurate routes/lines/sub-optimal plans	1	4	
Not enough journey plans	1	1	3
Not enough or no PT solutions	3	2	1
Effect of preferences on filtering/sorting of results	3	4	
No result matching preference	2		
GUI issues (e.g. icons not accurate or clear)		1	
Unexpected mode suggestions		3	
Irrational results (e.g. duration too long, too many interchanges)		2	1

Figure 7 shows the same data as a stacked bar chart. Specifically in Berlin, B2 (car-pooling) was more problematic than B1 and B3. From the comments received, it seems that the driver offering a lift-share was more successful than a MyWay user looking to be given a lift. Users performing the tests as potential passengers did not succeed in getting journey plans. This suggests that this functionality was not yet performing as expected.

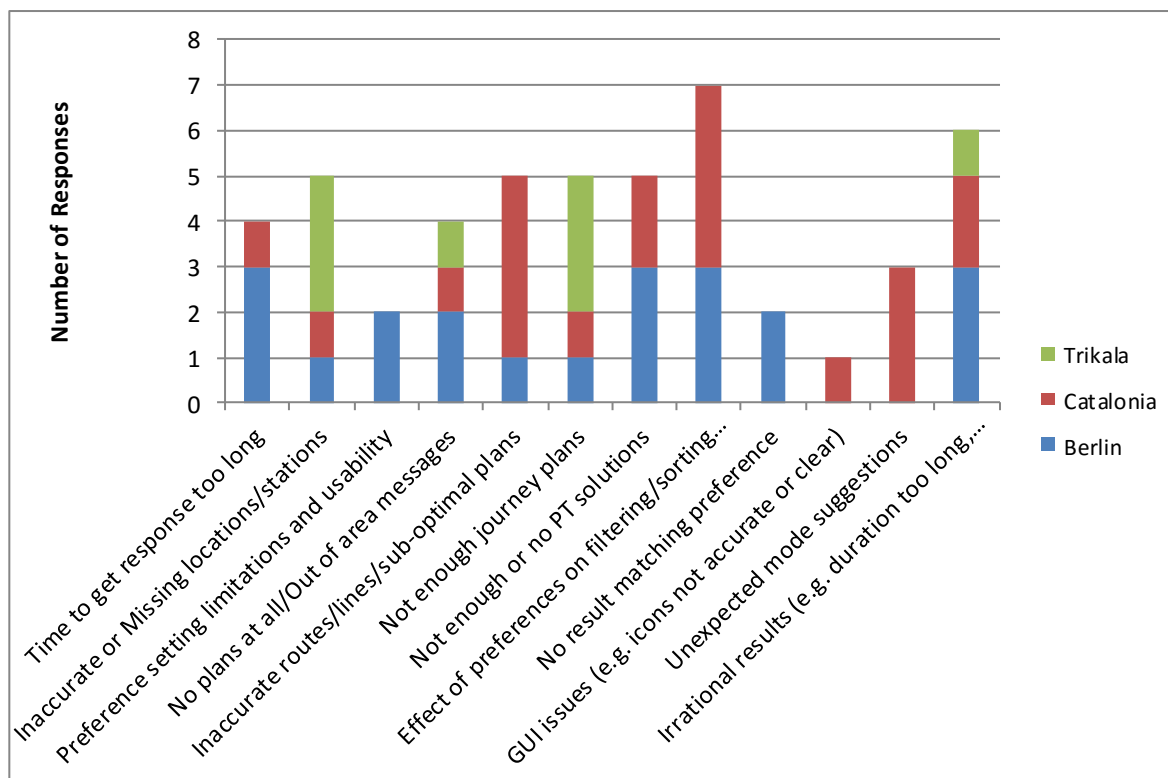


Figure 7. Ways in which SJP test journey plans did not meet testers' expectations

The following questions aimed to analyse the perceptions of testers about the quality of plans suggested.

The responses to the question “How long was the total journey time indicated?” are shown in Table 24. There were very variable results for this question in Berlin. As there was only one response for B2, and only 2 responses for B3, no conclusions can be drawn about how accurate the journey times are for these scenarios. However, scenario B1 shows a lot of variation. The results in Catalonia were much more reliable, although it is noticeable that there is more variation in returned trip duration for scenario C2 than for the other scenarios. The result in Trikala is also quite variable. However, with only three data points for each scenario, no conclusions can be drawn.

Table 24. Duration of journey time suggestions

	Berlin			Catalonia			Trikala		
	B1	B2	B3	C2	C4	C5	T1	T2	T3
Mean duration (mins)	16	40.5	25.5	102	59	35	30	24	85
Max	25	52	52	113	62	35	39	36	97
Min	7	29	22	93	55	35	26	11	77

The mean ratings in the questions “In your opinion, is this journey duration acceptable for the distance?” and “In your opinion is this journey duration appropriate for the preference settings?” are shown in Table 25. From this table it can be seen that the results for perceptions of journey duration are better in Catalonia, which is not surprising, as the results were much less variable within and between scenarios. The weighted mean across all SJP tests is 2.47, falling somewhere between ‘Quite Short’ and ‘Average’. This result is quite good but heavily influenced by the better results in Catalonia. The participants on the whole did not notice any particular problems in the journey durations indicated, in relation to the preference settings for each scenario

Table 25. Perceptions about journey duration (1: Very short, 5: Very long) and about appropriateness for preferences (1: Very appropriate, 5: Very inappropriate)

Living Lab	Mean rating Perceived Duration	Mean rating Appropriateness of duration for preferences
Berlin	3.00	2.22
Catalonia	2.07	2.93
Trikala	3.11	2.33
Weighted Mean	2.47	2.67

The testers' responses to the questions “In your opinion are the interchanges reasonable in relation to the scenario?” and “In your opinion are the interchanges reasonable in relation to your local knowledge?” are shown in Table 26. The responses are not analysed for scenarios that should not have contained interchanges, as is the case for B2 in Berlin. The results in Berlin are quite positive in relation to testers' opinions about whether the

number of interchanges is reasonable for the scenario. In relation to their opinions about the number of interchanges in relation to their own local knowledge, the results are also very good. The Catalonia data had many missing values for C4 and C5, and therefore it is not advisable to draw strong conclusions from this data. However, all the means are in the positive perceptions part of the scale, which is encouraging.

In relation to the scenarios, the opinions are a little less positive than they are in relation to the testers' local knowledge. This is quite surprising, but it might relate to testers expecting MyWay to find better ways of travelling from A to B than the testers have found themselves, especially in relation to fulfilling raised expectations in relation to specific scenario properties. As regards Trikala, there are only three values per scenario. As T2 is also about parking for a series of appointments, the question is not entirely meaningful. However, the mean response suggests that testers generally perceived the number of interchanges to be reasonable in relation to the scenario, but slightly less so in relation to their local knowledge. These results are opposite to Catalonia, in the sense that Trikala testers find that their expectations regarding overall number of interchanges are very well met in relation to the scenario properties, but that the plans are less good in relation to their own personal knowledge, particularly for T3. However, all the results are above the mid-point of the scale.

Table 26. Ratings of interchanges reasonability in relation to scenario and local knowledge (1: Very reasonable, 5: Very unreasonable)

	Berlin		Catalonia			Trikala		
	B1	B3	C2	C4	C5	T1	T2	T3
N	6	3	9	2	4	3	3	3
Mean rating: reasonability in relation to scenario	1.67	2.00	2.56	2.00	2.25	1.67	1.67	1.00
Mean rating: reasonability in relation to local knowledge	1.75	1.00	1.89	2.00	1.75	1.67	2.00	2.33

The testers' suggestions to the question "For this scenario, what would make this journey plan better for you?" are discussed below.

The results in Berlin (some typical responses are shown in Figure 8) mostly relate to expectations in relation to journey plans, e.g. having more suggested departure times as with many current journey plans, having a greater range of modal options, and choice in the way of representing the suggested route. Whilst most people like maps, as was shown in the focus groups conducted in year 1 (see Deliverable 1.1), they also sometimes like to have the instructions written down. One tester also commented on the technical quality of MyWay by referring to the App's speed. A more concerning outcome in Berlin were the results for car-pooling (also known as car-sharing), which did not show up well in the tests and was mentioned by several testers.

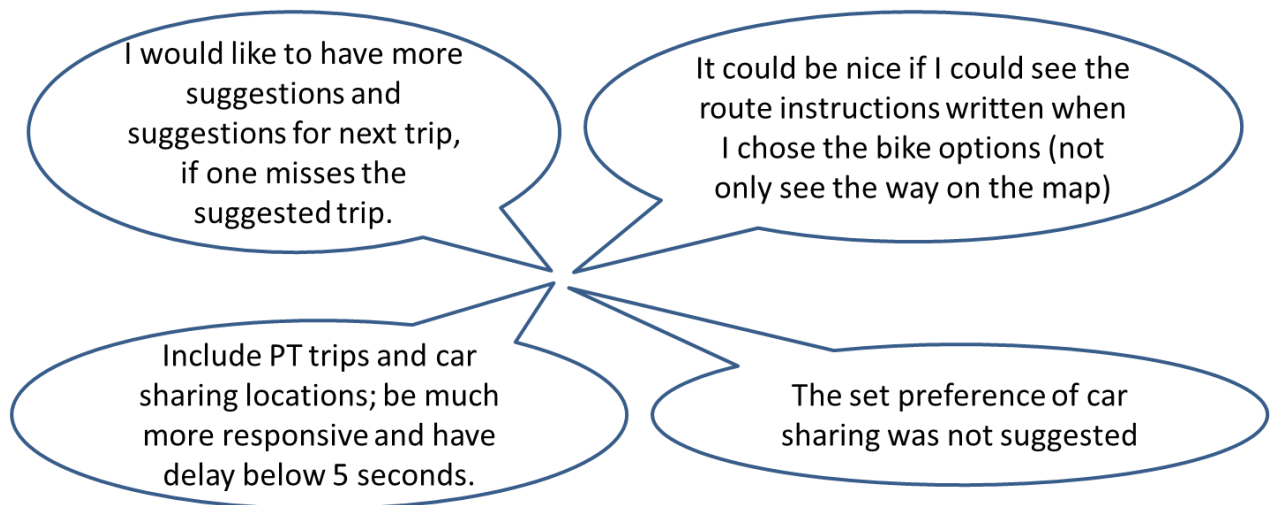


Figure 8. Typical verbatim responses to Question 7 in Berlin
"What would make this journey better for you (for this scenario)?"

Interestingly seven testers in Catalonia made positive responses to this question, indicating that they could not think of any improvements. Nevertheless other testers made some suggestions. These are included for Catalonia in Figure 9. These suggestions range from highlighting Point of Interest (POI) inaccuracies, to suggested new requirements (a preference to choose how much money to spend per journey), and doubt that all the accessible options have been presented through MyWay.

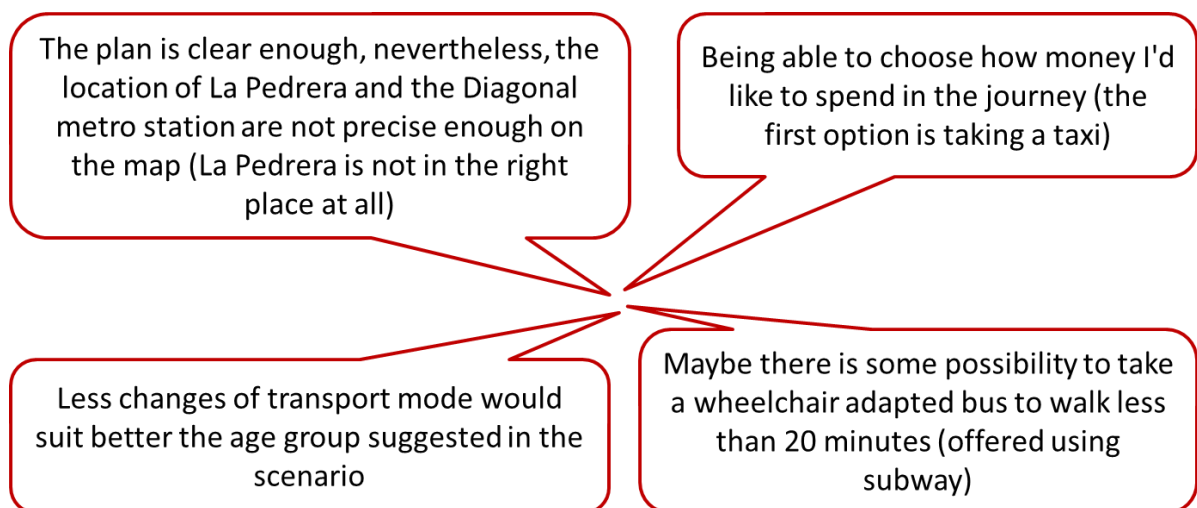


Figure 9. Selected Catalonia Responses to Q7
"What would make this plan better for you (for this scenario)?"

In Trikala (Figure 10), testers were mostly happy, though did make some suggestions regarding functionalities they would like to see in MyWay as future requirements. It is important to note that some of these requirements are dependent on data becoming availa-

ble for integration into MyWay rather than something that MyWay could already potentially deliver.

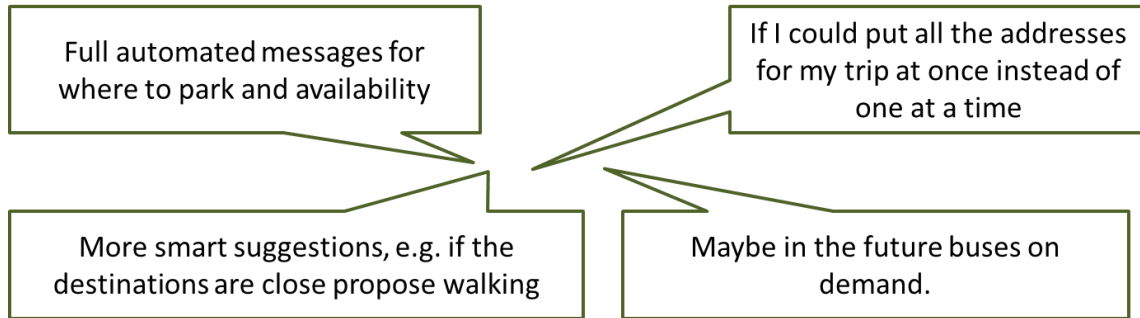


Figure 10. Selected Trikala responses to Q7
"What would make this plan better for you (for this scenario)?"

The next set of questions aimed to survey the usability of MyWay.

The mean ratings in the questions "How easy was it to plan the journey described in the scenario" and "Is the MyWay application easy to understand?" are shown in Table 27. The ratings for all scenarios have been combined. The results for Berlin are less positive than in Catalonia and Trikala for the perceived ease with which testers were able to plan the journeys in the scenarios. However, the Berlin results are still above the middle of the scale. This suggests that MyWay is relatively easy for new users to understand and use. As regards the ease of understanding question, this was intended to measure how intuitive MyWay is to understand overall. All the findings are above the middle of the scale, which is a positive and encouraging result.

Table 27. Perceptions about ease of planning and intuitiveness of MyWay (1: Very easy, 5: Very hard)

Living Lab	Mean rating Ease of planning	Mean rating MyWay's ease of understanding
Berlin	2.64	2.64
Catalonia	1.93	2.04
Trikala	1.78	1.78
Weighted Mean	2.04	2.11

Testers were then asked to rank their three most and three least favourite things about MyWay. The qualitative answers have been coded into categories. The quantified results are shown for all Living Labs together in Table 28. Multiple identical responses from individual testers have been screened out, but some responses were assignable to more than one category. The data has been ordered by frequency of responses for the first place mention. It is clear from this information that testers appreciated many important aspects of MyWay, including the design and operation of the User Interface, the innovative of the concept to combine more modes and more personalisation, and many other qualities.

Table 28. Most and least favourite things about MyWay

All Living Labs together	First place	Second place	Third place
UI/Clear/simple design/colour scheme	6	2	3
Bus info	5	1	1
Preference settings/ Personalisation/ customisation	4	2	1
Detailed route/map/stops	4	8	4
Different /intermodal journey options	3	4	1
Innovative metaplaning concept	2	1	1
Quick start (without preferences)	2	2	
Useful for locals and tourists	2		
Speed	1		
VBC statistics idea (inc. emissions and calories)	1	2	2
Preference icons	1		1
Accessibility info	1		
Usability/Intuitiveness	1	5	
Low data usage		1	
Not being tracked by Google		1	
Same app, different cities			1
Autocomplete addresses			1

The three least favourite features are shown in Table 29. From this it can be seen that the slower speed that results from the metaplaning concept is a source of some dissatisfaction. To a certain extent this is an inevitable result of the integration process from other sources of information, which have their own speed of response, as noted in section 3 above. It is likely that users will accept a small penalty in relation to response speed if the results (added-value) are significantly better than other options. Therefore, it is very important that data reliability problems, consistency of response and smartness of the journey planning algorithm's use of the preferences are perfected as much as possible

Table 29. The three least favourite things about MyWay

All Living Labs Together	Worst	Second worst	Third worst
Inadequate Response Speed	7	6	
Results not always consistent/no plans/unexpected results	5	3	3
Difficult/slow/confusing to set preferences well	4	4	3
Mode preferences vague/don't work/conflicting constraints	3	3	1
Search query autocomplete/address DB/stop locations	2	3	2
Lack of specific accessibility info	2		
Journey plans not always smart/needs more data (e.g. traffic)	2	1	
Ability to save settings	1		

Language/translation inaccurate	1	1
Don't like UI	1	
Too many choices		2
VBC statistics implementation poor		1
Lack of clarity between choosing specific mode and mode preferences	1	
Map info not detailed enough	2	
Need alternative car routes	1	

Testers were then asked whether there was something missing that they expected to see. There were a number of suggestions, some of which duplicate comments made in response to other questions. All the unique responses which seem useful for future improvements to MyWay are shown below.

Berlin

Timelines (such as the routes behave with one another); possibly an overview which accounts you've linked (e.g. . flinc , car2go ,) and, accordingly, only those displays as a possibility
 never had a real time information, which was promised
 Car sharing and bike sharing not available in MyWay
 The virtual keyboard didn't show up immediately when I selected the address field to type in a new location, had to click the field again.
 There was no bike sharing, only private bike routes

Catalonia

Maybe I would appreciate if there was a place where I could see my last destinations or routes (or a Favourite Routes section), just because I might search them again, and it would be useful not to introduce the same origin and destination all the time
 I expected to be able to save the location of my home as well as my favourite trips into the user preferences
 Yes, line e7 was not suggested by MyWay in this journey. I suppose this happens because I haven't indicated an alternative journey from the Parking (going from my home to the Park&Ride by car)
 Yes, before taking the underground I would like to know if the stations offered have elevators
 Maybe better information in the map (e.g. details for each route)/Selecting destination on the map/clearer map symbols
 Being able to choose travel costs

Trikala

Make it more reliable for the whole area, not strictly in the city.
 Maybe a voice to guide when using it in car
 Alternative car routes, not just one
 Make it easier for people with little experience in smartphones

Finally, testers were asked “How easy was it to find what you were looking for?”. The responses are shown in Table 30.

Table 30. Perceptions about ease of finding results (1: Very easy, 5: Very hard)

Living Lab		Mean rating
		Ease of finding results
Berlin		3.36
Catalonia		4.46
Trikala		2.33
Weighted Mean		3.87

The results to this question are much less positive than for other questions that relate to aspects of MyWay’s usability. The Qualitative comments, presented below, help to understand why.

Berlin

I can't find some stations near my home

Addresses can be entered badly. Mostly there is no proper house numbers

The application is easy to use. The suggestions are good.

Swiping for the plan details in the map section was a bit confusing

Menus can be confusing (user preferences, trip preferences, ..)

Speed of search results is slow, preference options confusing, mode of transport setting confusing, statistics not working

Some parts in the settings section are very unclear, I don't know what I can regulate with them. When the journey is calculated, in the overview of different possibilities, there could be some text as to what the possibilities relate to, additionally to just the pictogram e.g. bikesharing or car-sharing

I found it first confusing how to switch between trip results and map screen

journey was not suggested with the preferred mode of transport (car sharing)

Quite difficult to set preferences for different scenarios

The icons in the journey planner screen are a really good idea; however, the preferences seem to be redundant with the user preferences menu which is confusing.

Catalonia

For people whose age is over 65, the map is full of icons that lead to services we don't know and once the route is set, the icons might disappear just to make even clearer the path we're following

I found it difficult to search the destination of my route, since I had to look for UAB in

Cerdanyola del Valles and it appeared as Bellaterra, that was never mentioned in the scenario's text.

In this case, MyWay app has fit very well my expectations

More transport information adapted to these groups (reduced mobility). I think it's important to know if there are any incidents in the service

Further options missing (e.g. RENFE train, FGC)

It is not easy to understand the way to recalculate the routes when adding special settings (like reduced mobility)

In my opinion it is a bit difficult to find the preference options that I need. Ca l'Artigues belongs to municipality of Lliçà d'Amunt. This information isn't in MyWay, not even in the scenario.

In my opinion, the search of the required preferences is a bit difficult.

Trikala

Support for Greek names of the streets.

Very nice try, hope it gets better.

Good work! Local bus info is what makes it stand out.

Testers had an opportunity to add any further comments they wished. In many cases these elaborate on other questions. As this came as a final question, there are fewer comments, however some are positive and encouraging. None of the Trikala testers made any responses to this question.

Berlin

Sometimes the app is slow. Information about more trip routes would be nice.

The term 'preferences' is over-used for different items, it could be simplified

App is a good idea but there are many competitors in Berlin. It is not clear what is much better in MyWay than in comparable Apps in Berlin

No weather warning despite -6 degrees

By the way, the trip following did not work. It zoomed into some coordinate in the ocean south of Africa (maybe lat = 0, long = 0)

Catalonia

I had problems with the App closing unexpectedly while searching, and also while setting routes.

I don't find MyWay intuitive enough, and sometimes it's difficult to know if the journey suggested is really the best way to go from one point to another. On the other hand, I

don't find this test easy to be answered.

I have changed my mind about MyWay app and I think it works quite well. This app gives the possibility to indicate specific needs and preferences.

It looks like it is not possible to set up a specific starting time for the journey, this fact makes MyWay less useful if you want to plan your trip in advance.

4.2 Subjective opinions of users

The users' responses in each of the three Subjective Evaluation Questionnaires of Phase 2 per Living Lab to the statement "I think that I would like to use this system frequently / more frequently than other planners" are shown in Table 31. In general the responses are positive but close to the neutral rating (0), which represents the answer "I would use it as frequently as other planners". The weighted average of responses by users in Catalonia in the third questionnaire was 0.36. Users in Berlin were more neutral, the weighted average of their responses in the third questionnaire was 0.07. Users in Trikala were of similar opinion, the weighted average of their responses in the third questionnaire was 0.17. The responses by Android users were less positive than the responses by iOS users in all LLs and all time points. Especially in Berlin Android users responded that they rather disagree, the weighted average of their responses in the third questionnaire was -0.5. Still, these findings should be considered with care, as the Wilcoxon signed-rank test did not detect any difference between responses of the "Same users" per time point in each LL and no difference between the responses by Android and iOS users.

Table 31. Stated willingness to use MyWay, users' responses to the statement "I think that I would like to use this system frequently / more frequently than other planners" (-2: Strongly disagree, +2: Strongly agree)

Living lab	Time point	All users		Same users		Android users		iOS users	
		N	Weighted Average	N	Weighted Average	N	Weighted Average	N	Weighted Average
Catalonia	SEQ-1	85	0.10	61	0.13	64	0.06	21	0.23
	SEQ-2	65	0.12	61	0.19	51	0.05	14	0.28
	SEQ-3	62	0.36	61	0.36	48	0.33	14	0.57
Berlin	SEQ-1	22	0.09	11	0.45	16	-0.06	6	0.5
	SEQ-2	13	0.15	11	0.36	9	-0.11	4	0.75
	SEQ-3	13	0.07	11	0.27	10	-0.5	3	1.6
Trikala	SEQ-1	23	0.21	23	0.21	10	0.1	13	0.30
	SEQ-2	23	0.30	23	0.30	10	0.1	13	0.46
	SEQ-3	23	0.17	23	0.17	10	0.2	13	0.23

The users' responses in each of the three Subjective Evaluation Questionnaires per Living Lab to the statement "I found the system unnecessarily complex / more complex than other planners" are shown in Table 32. Users in all Living Labs found MyWay as rather less complex than other mature planners. The weighted average of responses in the third questionnaire was 0.51 in Catalonia, 0.69 in Berlin and 0.47 in Trikala. Responses by iOS users were more positive than those by Android users. No differences between responses of the "Same users" per time point in each LL and no difference between the responses by Android and iOS users was found using the Wilcoxon signed-rank test.

Table 32. Perceptions about MyWay complexity, users' responses to the statement "I found the system unnecessarily complex / more complex than other planners" (-2: Strongly agree, +2: Strongly disagree)

Living lab	Time point	All users		Same users		Android users		iOS users	
		N	Weighted Average	N	Weighted Average	N	Weighted Average	N	Weighted Average
Catalonia	SEQ-1	85	0.30	61	0.34	64	0.14	21	0.8
	SEQ-2	65	0.27	61	0.26	51	0.15	14	0.47
	SEQ-3	62	0.51	61	0.49	48	0.04	14	0.5
Berlin	SEQ-1	22	0.40	11	0.54	16	0.12	6	1.1
	SEQ-2	13	0.61	11	0.54	9	0.33	4	1.25
	SEQ-3	13	0.69	11	0.54	10	0.3	3	2
Trikala	SEQ-1	23	0.30	23	0.30	10	0.1	13	0.46
	SEQ-2	23	0.39	23	0.39	10	0.1	13	0.61
	SEQ-3	23	0.47	23	0.47	10	0.5	13	0.46

The users' responses in each of the three Subjective Evaluation Questionnaires per Living Lab to the statement "I thought the system was easy to use / easier to use than other planners" are shown in Table 33. Users responded that MyWay was as easy to use as other mature planners. The weighted average of responses in the third questionnaire in Catalonia was -0.12, in Berlin it was 0.38 and in Trikala it was 0.04. Responses by iOS users were more positive than those by Android users in the majority of cases. No differences between the responses of the "Same users" per time point in each LL and no difference between the responses by Android and iOS users was found using the Wilcoxon signed-rank test.

Table 33. Perceptions about MyWay ease of use, users' responses to the statement "I thought the system was easy to use / easier to use than other planners" (-2: Strongly disagree, +2: Strongly agree)

		All users		Same users		Android users		iOS users	
Living lab	Time point	N	Weighted Average	N	Weighted Average	N	Weighted Average	N	Weighted Average
Catalonia	SEQ-1	85	-0.2	61	-0.34	64	-0.31	21	0.04
	SEQ-2	65	-0.09	61	-0.24	51	-0.19	14	0.28
	SEQ-3	62	-0.12	61	-0.49	48	-0.14	14	0
Berlin	SEQ-1	22	0.27	11	-0.54	16	0.06	6	0.83
	SEQ-2	13	0.07	11	-0.54	9	-0.22	4	1.25
	SEQ-3	13	0.38	11	-0.54	10	0	3	1.66
Trikala	SEQ-1	23	0.04	23	-0.30	10	0.3	13	-0.07
	SEQ-2	23	0.39	23	-0.39	10	0.3	13	0.46
	SEQ-3	23	0.04	23	-0.47	10	0	13	0.07

The users' responses to the statement "I thought there was too much inconsistency in this system / much more inconsistency in this system than other planners" are shown in Table 34. Users in Catalonia and Trikala responded that there was no difference in consistency between MyWay and other mature planners, the weighted average of their responses in the third questionnaire was 0.30 in Catalonia and 0.26 in Trikala. In Berlin users responded that MyWay was rather more consistent than other mature planners, the weighted average of their responses in the third questionnaire was 0.61. Responses by iOS users are more positive than those by Android users in Berlin, but less positive in Trikala and in the third questionnaire in Catalonia. No differences between responses of the "Same users" per time point in each LL and no difference between the responses by Android and iOS users was found using the Wilcoxon signed-rank test.

Table 34. Perceptions about MyWay inconsistency, users' responses to the statement "I thought there was too much inconsistency in this system / much more inconsistency in this system than other planners" (-2: Strongly agree, +2: Strongly disagree)

		All users		Same users		Android users		iOS users	
Living lab	Time point	N	Weighted Average	N	Weighted Average	N	Weighted Average	N	Weighted Average
Catalonia	SEQ-1	85	-0.02	61	-0.11	64	0.12	21	0.28
	SEQ-2	65	0.15	61	0.18	51	0.19	14	0.14
	SEQ-3	62	0.30	61	0.27	48	0.31	14	0.28

Berlin	SEQ-1	22	0.36	11	0.36	16	-0.06	6	1.16
	SEQ-2	13	0.61	11	0.36	9	0.22	4	1.5
	SEQ-3	13	0.61	11	0.72	10	0.33	3	1.6
Trikala	SEQ-1	23	0.34	23	0.34	10	0.4	13	0.3
	SEQ-2	23	0.21	23	0.21	10	0.2	13	0.23
	SEQ-3	23	0.26	23	0.26	10	0.3	13	0.23

The users' responses to the statement "I would imagine that most people would learn to use this system quickly / much more quickly than other planners" are shown in Table 35. Users in Catalonia and Trikala responded that people would learn MyWay as quickly as other mature planners, the weighted average of their responses in the third questionnaire was 0.20 and 0.04 respectively. The responses by users in Berlin are more positive, namely that MyWay would be learnt rather more quickly than other planners, the weighted average of their responses in the third questionnaire was 0.61. No differences between responses of the "Same users" per time point in each LL and no difference between the responses by Android and iOS users was found using the Wilcoxon signed-rank test.

Table 35. Perceptions about MyWay learnability, users' responses to the statement "I would imagine that most people would learn to use this system quickly / much more quickly than other planners" (-2: Strongly disagree, +2: Strongly agree)

Living lab	Time point	All users		Same users		Android users		iOS users	
		N	Weighted Average	N	Weighted Average	N	Weighted Average	N	Weighted Average
Catalonia	SEQ-1	85	0.01	61	0	64	-0.07	21	0.28
	SEQ-2	65	-0.07	61	-0.03	51	-0.15	14	0.57
	SEQ-3	62	0.20	61	0.03	48	0.10	14	0.57
Berlin	SEQ-1	22	0.25	11	0.90	16	0.75	6	0.66
	SEQ-2	13	0.76	11	0.54	9	0.38	4	1
	SEQ-3	13	0.61	11	0.54	10	0.3	3	1.6
Trikala	SEQ-1	23	0.21	23	0.21	10	0.2	13	0.23
	SEQ-2	23	0	23	0	10	-0.1	13	0.15
	SEQ-3	23	0.04	23	0.04	10	-0.1	13	0.15

The users' responses to the statement "I felt confident using the system / much more confident using the system than other planners" are shown in Table 36. Users in Catalonia and Trikala responded that they felt as confident as when using other mature planners, the weighted average of their responses in the third questionnaire was -0.18 and 0.17 respectively. Users in Berlin responded that they felt rather more confident when us-

ing MyWay than other mature planners, the weighted average of responses in the third questionnaire was 0.99. iOS users were more positive in Catalonia and Berlin, while Android users were more positive in Trikala. No differences between responses of the “Same users” per time point in each LL and no difference between the responses by Android and iOS users was found using the Wilcoxon signed-rank test.

Table 36. Perceptions about confidence in using MyWay, users’ responses to the statement ““I felt confident using the system / much more confident using the system than other planners” (-2: Strongly disagree, +2: Strongly agree)

Living lab	Time point	All users		Same users		Android users		iOS users	
		N	Weighted Average	N	Weighted Average	N	Weighted Average	N	Weighted Average
Catalonia	SEQ-1	85	-0.33	61	-0.34	64	-0.44	21	0
	SEQ-2	65	-0.20	61	-0.15	51	-0.31	14	0.21
	SEQ-3	62	-0.18	61	-0.21	48	-0.21	14	-0.07
Berlin	SEQ-1	22	0.50	11	0.91	16	0.75	6	-0.17
	SEQ-2	13	0.77	11	0.82	9	0.44	4	1.5
	SEQ-3	13	0.99	11	0.91	10	0.70	3	2
Trikala	SEQ-1	23	0.30	23	0.30	10	0.40	13	0.23
	SEQ-2	23	0.17	23	0.17	10	0.20	13	0.15
	SEQ-3	23	0.17	23	0.17	10	0.20	13	0.15

The users’ responses to the statement “I needed to learn a lot of things before I could get going with this system / much more things before I could get going with this system than with other planners” are shown in Table 37. Users in Catalonia and Berlin responded that they rather disagreed, the weighted average of their responses in the third questionnaire was 0.85 and 1.08 respectively. Users in Trikala also rather disagreed, although the weighted average of their responses in the third questionnaire was a bit lower, 0.39. Similarly to the previous statement, iOS users were more positive in Catalonia and Berlin, while Android users were more positive in Trikala. No differences between responses of the “Same users” per time point in each LL and no difference between the responses by Android and iOS users was found using the Wilcoxon signed-rank test.

Table 37. Perceptions about MyWay intuitiveness, users' responses to the statement "I needed to learn a lot of things before I could get going with this system / much more things before I could get going with this system than with other planners" (-2: Strongly agree, +2: Strongly disagree)

Living lab	Time point	All users		Same users		Android users		iOS users	
		N	Weighted Average	N	Weighted Average	N	Weighted Average	N	Weighted Average
Catalonia	SEQ-1	85	0.74	61	0.72	64	0.64	21	1.05
	SEQ-2	65	0.63	61	0.65	51	0.47	14	1.21
	SEQ-3	62	0.85	61	0.84	48	0.75	14	1.21
Berlin	SEQ-1	22	0.91	11	0.99	16	0.56	6	1.83
	SEQ-2	13	1.08	11	0.99	9	0.78	4	1.75
	SEQ-3	13	1.08	11	0.99	10	0.80	3	2.0
Trikala	SEQ-1	23	0.61	23	0.61	10	0.5	13	0.69
	SEQ-2	23	0.69	23	0.69	10	0.7	13	0.69
	SEQ-3	23	0.39	23	0.39	10	0.8	13	0.08

The users' stated trust in the MyWay journey recommendations is shown in Table 38. Users in all Living Labs responded that they rather trust the MyWay journey recommendations. No difference between responses of the "Same users" per time point was found using the Wilcoxon signed-rank test.

Table 38. Stated trust in MyWay journey recommendations (-2: Not at all, +2: Absolutely yes)

Living lab	Time point	All users		Same users	
		N	Weighted Average	N	Weighted Average
Catalonia	SEQ-1	85	0.46	61	0.39
	SEQ-2	65	0.32	61	0.36
	SEQ-3	62	0.42	61	0.41
Berlin	SEQ-1	22	0.68	11	0.91
	SEQ-2	13	0.69	11	0.73
	SEQ-3	13	0.77	11	0.82
Trikala	SEQ-1	23	0.78	23	0.78
	SEQ-2	23	0.39	23	0.39
	SEQ-3	23	0.48	23	0.48

The users' stated feeling of certainty when using MyWay are shown in Table 39. Users in Berlin and Trikala responded that they felt rather sure that their journey would go as planned when using MyWay, the weighted average of their responses in the third questionnaire was .77 in Berlin and 0.56 in Trikala. The responses by users in Catalonia were closer to the neutral response (neither sure nor unsure), the weighted average in the third time point was 0.21. No difference between responses of the "Same users" per time point was found using the Wilcoxon signed-rank test.

Table 39. Responses to the question "Do you feel sure that your journey will go as planned when using the MyWay system?" (-2: Not sure at all, +2: Absolutely sure)

		All users		Same users	
Living lab	Time point	N	Weighted Average	N	Weighted Average
Catalonia	SEQ-1	85	0.16	61	0.05
	SEQ-2	65	0.08	61	0.09
	SEQ-3	62	0.21	61	0.20
Berlin	SEQ-1	22	0.50	11	0.64
	SEQ-2	13	0.69	11	0.64
	SEQ-3	13	0.77	11	0.82
Trikala	SEQ-1	23	0.52	23	0.52
	SEQ-2	23	0.30	23	0.30
	SEQ-3	23	0.56	23	0.56

5. ACCEPTANCE EVALUATION

The acceptance was evaluated in terms of investigating the frequency of use of MyWay and the users' perceptions about the MyWay usefulness and their satisfaction from and trust in it.

The MyWay application downloads are shown in Figure 11 and Figure 12. Until mid-March 2016 there were a total of 337 active installations for the Android, as reported by the Google play developer console, and 333 installations for iOS version, as reported by the iTunes Connect. These numbers refer to applications that have been downloaded and are still installed in the mobile device. The following graphs show that there were new downloads even after the end of the Phase 2 tests.

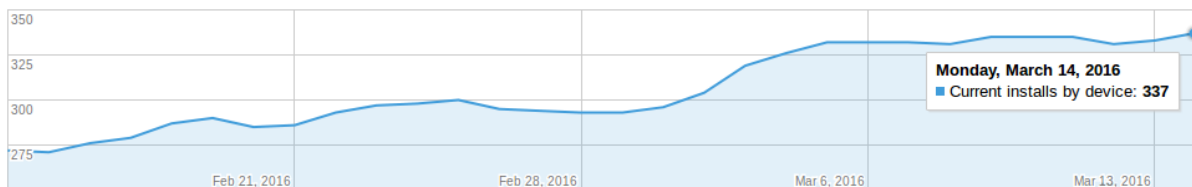


Figure 11. MyWay Android version downloads (cumulative)

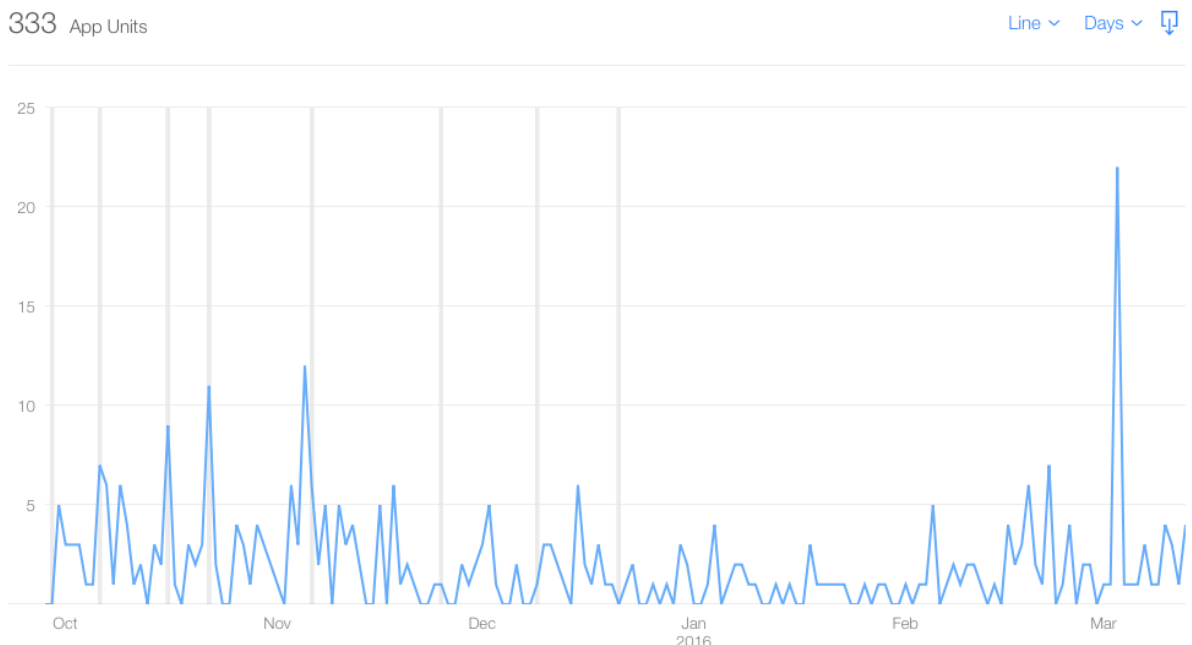


Figure 12. MyWay iOS version downloads

In Deliverable 1.4 [MyWay D1.4], it was planned to analyse the frequency of use of MyWay, measured as the number of registered users who used MyWay at least once per time point. Analysing the logs, it was found that the majority of users made anonymous use of MyWay. Although there were 362 (authenticated) users registered in MyWay during the whole Phase 2, only few authenticated requests were logged. Splitting the Phase 2 in three time periods, of approximately similar duration, there were 63 authenticated users with requests in period 1 (20 October – 10 November), 61 users in period 2 (11 November – 30 November) and 66 users in period 3 (1 December – 20 December). Since the majority of requests were done by users not having logged-in, it was understood that these indicators, which should be based on requests by authenticated users, could not be plausibly calculated and would not be representative of the frequency of use of MyWay. Moreover, MyWay is not a high frequency application, as it is to be used for unfamiliar trips or in case of events, when a user needs to re-plan his/her trip. Therefore, the relative stability shown by the frequency of use by authenticated users should be cautiously welcomed.

The users' responses in each of the three Subjective Evaluation Questionnaires per Living Lab to the question "During the last period I have been using the MyWay system frequently / more frequently than other planners" are shown in Table 40. Users in all LLs responded that they used MYWay as frequently as other commercial planners in the last period. In Catalonia the weighted average of responses ranged between 0.01 in the first time point to -0.05 in the third. The weighted average of responses in Berlin was 0.3 and in Trikala -0.13 in the third time point. Users' responses were not found to change with time, as the Wilcoxon signed-rank test did not detect any difference between time points in the sample of "Same users".

Table 40. Stated frequency of MyWay use during the last period (-2: Strongly disagree, +2: Strongly agree)

Living lab	Time point	All users		Same users	
		N	Weighted Average	N	Weighted Average
Catalonia	SEQ-1	85	0.01	61	0.03
	SEQ-2	65	-0.36	61	-0.16
	SEQ-3	62	-0.05	61	-0.08
Berlin	SEQ-1	22	-0.40	11	0.13
	SEQ-2	13	0.30	11	0.45
	SEQ-3	13	0.30	11	0.45
Trikala	SEQ-1	23	-0.04	23	-0.04
	SEQ-2	23	-0.04	23	-0.04
	SEQ-3	23	-0.13	23	-0.13

As regards the acceptance of 1st and 2nd MyWay suggestions as shown in Table 7, the percentage of users who used the TripFollowing functionality and did select the first or second MyWay suggestion was over 60% in all LLs and time periods, with the only exception being the second time period for Trikala. Very few requests, as logged by the TripFollower, were followed to conclusion of the trip. Users' consultation revealed that this was mainly due to problems with the functionality itself, for example it stopped in cases of low GPS signal, and users were reluctant to activate it again.

The users' stated trust in innovative transport modes per Living Lab are shown in

Table 41. All users in all LLs responded that they rather trust the innovative transport modes, as all weighted averages were above 0.5 in all Living Labs and all time points. The Wilcoxon signed-rank test did not detect any difference between time points in the sample of "Same users".

Table 41. Stated trust in innovative transport modes (-2: Not at all, +2: Absolutely yes)

		All users		Same users	
Living lab	Time point	N	Weighted Average	N	Weighted Average
Catalonia	SEQ-1	85	0.62	61	0.62
	SEQ-2	65	0.58	61	0.57
	SEQ-3	62	0.69	61	0.60
Berlin	SEQ-1	22	0.55	11	0.90
	SEQ-2	13	0.54	11	0.54
	SEQ-3	13	0.38	11	0.45
Trikala	SEQ-1	23	0.87	23	0.86
	SEQ-2	23	0.52	23	0.43
	SEQ-3	23	0.69	23	0.69

The users' ratings of Usefulness and Satisfying, using the User Acceptance Scale by Van der Laan, Heino, & De Waard (1997) [Van der Lann, 1997], are given in Table 42 per Living Lab. All ratings were above the neutral (3), meaning that users found MyWay useful and were satisfied with it. In Catalonia and Berlin ratings seem to get better with time, which was not the case in Trikala. The Wilkonxon signed rank test did not find any difference between users' ratings of MyWay and of other commercial mature planners.

Table 42. Usefulness and Satisfying score for MyWay (1: Worst rating, 5: Best rating)

			MyWay		Other planners	
Living lab	Time point	N	Usefulness	Satisfying	Usefulness	Satisfying
Catalonia	SEQ-1	85	3.31	3.59	3.90	3.76
	SEQ-2	65	3.37	3.52	3.89	3.73
	SEQ-3	62	3.61	3.72	3.94	3.82
Berlin	SEQ-1	22	3.54	3.52	3.97	3.65
	SEQ-2	13	3.54	3.65	3.83	3.71
	SEQ-3	13	3.60	3.57	3.81	3.59
Trikala	SEQ-1	23	3.44	3.39	3.11	3.16
	SEQ-2	23	3.34	3.38	3.28	3.30
	SEQ-3	23	3.21	3.30	3.14	3.00

6. Estimated MyWay impact

6.1 Users' opinions

As explained in Section 4.1.2, there were little data available from the TripFollowing functionality relevant to the actual usage of transport modes by participants. For example, in Catalonia there were only 14 trips for which data was logged by the TripFollower for the total duration of Phase 2. Therefore, no further analysis of usage of transport modes, based on such data was conducted.

In order to calculate a weighted average of stated usage of transport modes, the users' answers have been coded as follows: 0 – Never, 1 – Only once, 4 – Several days a week, 7 – Every day, 14 – More than once a day. The weighted averages of users' stated usage of transport modes before being introduced to MyWay (background) and at the three time points along Phase 2 tests, as captured by the three SEQs, are shown in Table 43. The stated usage of private car seems to be less in the third questionnaire in Catalonia (2.94) than in the background (4.92) and in Trikala (weighted average 5.89 in background versus 4.14 in the third questionnaire). In Berlin the users' statements do not seem to change.

Table 43. Stated usage of transportation means (0: Never, 14: More than once a day) – All users

Living lab	Time point	N	Private car	Mo-ped	Public bike	Public transport	Flexible on demand	Walking the whole trip
Catalonia	Background	116	4.92	3.86	0.88	6.44	0.15	6.4
	SEQ-1	85	3.15	0.89	1.27	5.98	0.05	6.3
	SEQ-2	65	3.07	0.93	0.82	5.73	0.09	6.4
	SEQ-3	62	2.94	0.93	1.24	6.03	0.29	6.8
Berlin	Background	54	3.08	0.06	0.30	8.23	1.35	5.6
	SEQ-1	22	2.54	0	0.23	8.23	0.46	5.5
	SEQ-2	13	2.93	0	0.67	8.78	2.23	8.4
	SEQ-3	13	3.16	0	0.08	7.92	1.54	6.9
Trikala	Background	34	5.89	1.52	0.52	1.76	0.65	4.1
	SEQ-1	23	6.17	2.23	0	0.17	0.04	5.2
	SEQ-2	23	4.71	1.62	0.04	0.22	0.26	5.6
	SEQ-3	23	4.14	2.39	0.18	0.65	0.44	5.2

To check whether there are any significant differences between users' responses in the questionnaires, the responses of only those users who completed all four questionnaires ("Same users") are shown in Table 44. No difference in answers between time points was identified by the Wilcoxon signed-rank test, still the same trend can be seen in the stated usage of private car in Catalonia (3.56 in background versus 2.87 in SEQ3) and Trikala (6.21 in background versus 4.13 in SEQ3).

Table 44. Stated usage of means (0: Never, 14: More than once a day) – "Same user"

Living lab	Time point	N	Private car	Mo-ped	Public bike	Public transport	Flexible on demand	Walking the whole trip
Catalonia	Background	61	3.56	0.57	1.02	5.39	0.24	6.4
	SEQ-1	61	3.04	0.53	1.17	6.16	0.05	6.6
	SEQ-2	61	3.10	0.75	1.03	5.78	0.10	6.4
	SEQ-3	61	2.97	0.71	1.27	6.07	0.13	6.5
Berlin	Background	11	0.90	0.90	0.10	11.3	0.60	6.5
	SEQ-1	11	2.46	0	0.46	8.73	0.73	6.2
	SEQ-2	11	2.18	0	0.82	8.73	1.36	8.6
	SEQ-3	11	2.46	0	0.09	8.37	1.73	6.5
Trikala	Background	23	6.21	2.08	0.64	0.30	0.09	4.4
	SEQ-1	23	6.17	2.23	0	0.17	0.04	5.2
	SEQ-2	23	4.69	1.62	0.04	0.22	0.26	5.6
	SEQ-3	23	4.13	2.39	0.18	0.65	0.44	5.2

The users' immediate reaction to MyWay is shown in Table 45. In all Living Labs the users' immediate reaction was always positive. In Catalonia the weighted average of responses ranged from 0.39 in the second questionnaire to 0.59 in the third. In Berlin the ratings were even more positive (weighted average over 1 in all three questionnaires). In Trikala the weighted average ranged between 0.74 in the first and second questionnaires to 0.44 in the third.

Table 45. Stated immediate reaction to MyWay (-2: Very negative, +2: Very positive)

Living lab	Time point	All users		Same users	
		N	Weighted Average	N	Weighted Average
Catalonia	SEQ-1	85	0.43	61	0.49
	SEQ-2	65	0.39	61	0.44
	SEQ-3	62	0.59	61	0.51

Berlin	SEQ-1	22	0.73	11	1
	SEQ-2	13	0.85	11	1.1
	SEQ-3	13	0.85	11	1
Trikala	SEQ-1	23	0.74	23	0.74
	SEQ-2	23	0.74	23	0.74
	SEQ-3	23	0.44	23	0.44

The users' overall satisfaction with MyWay is shown in Table 46. The stated satisfaction was higher in the third questionnaire for Catalonian users (weighted average 0.45) compared to the first one (0.24). On the contrary, in Berlin and Trikala the stated satisfaction decreased in the third compared to the first questionnaire (0.38 versus 0.50 and 0.21 versus 0.69 respectively). Still all the ratings are positive and show that users in all LLs are rather satisfied with MyWay. The differences between questionnaires are not statistically significant according to the Wilcoxon signed-rank test in the sample of "Same users".

Table 46. Stated immediate overall satisfaction with MyWay (-2: Not satisfied at all, +2: Completely satisfied)

		All users		Same users	
Living lab	Time point	N	Weighted Average	N	Weighted Average
Catalonia	SEQ-1	85	0.24	61	0.27
	SEQ-2	65	0.29	61	0.29
	SEQ-3	62	0.45	61	0.42
Berlin	SEQ-1	22	0.50	11	0.54
	SEQ-2	13	0.38	11	0.45
	SEQ-3	13	0.38	11	0.45
Trikala	SEQ-1	23	0.69	23	0.69
	SEQ-2	23	0.30	23	0.30
	SEQ-3	23	0.21	23	0.21

The users' judgments about the potential benefit of having access to MyWay are shown in Table 47, where 0 signifies a "moderate" benefit. Users in Catalonia expected a more than moderate benefit in all three time points, the weighted average of responses was 0.14 in the first questionnaire and 0.23 in the third. Users in Berlin expected a higher benefit than in Catalonia, the weighted average of responses ranged from 0.45 in the first to 0.69 in the third questionnaire. Users in Trikala expected a moderate benefit (weighted average of 0.07 in the second and third questionnaires). No differences between questionnaires by the "Same users" in each LL were found using the Wilcoxon signed-rank

test.

Table 47. Judgment about benefit of having access to MyWay (-2: No benefit, +2: Very large benefit)

		All users		Same users	
Living lab	Time point	N	Weighted Average	N	Weighted Average
Catalonia	SEQ-1	85	0.14	61	0.20
	SEQ-2	65	0.12	61	0.18
	SEQ-3	62	0.23	61	0.25
Berlin	SEQ-1	22	0.45	11	0.54
	SEQ-2	13	0.62	11	0.88
	SEQ-3	13	0.69	11	0.88
Trikala	SEQ-1	23	-0.14	23	-0.14
	SEQ-2	23	0.07	23	0.07
	SEQ-3	23	0.07	23	0.07

The users' estimations about the possibility to choose the optimal route according to their preferences when using MyWay are shown in Table 48. Users in Catalonia and Berlin estimated that this possibility will increase slightly (weighted average 0.58 in the third questionnaire for both LLs). Users in Trikala did not expect a change in this possibility when using MyWay (weighted average 0 in the third questionnaire). Again, no differences between questionnaires by the "Same users" in each LL were found using the Wilcoxon signed-rank test.

Table 48. Estimations about possibility to choose optimal route according to preferences (-2: Will radically decrease, +2: Will radically increase)

		All users		Same users	
Living lab	Time point	N	Weighted Average	N	Weighted Average
Catalonia	SEQ-1	85	0.66	61	0.44
	SEQ-2	65	0.67	61	0.73
	SEQ-3	62	0.58	61	0.59
Berlin	SEQ-1	22	0.77	11	-0.09
	SEQ-2	13	1.08	11	-0.6
	SEQ-3	13	0.8	11	0.54
Trikala	SEQ-1	23	0.43	23	0.43

	SEQ-2	23	0.21	23	0.21
	SEQ-3	23	0.00	23	0.0

The users' estimations about the impact of using MyWay on their stress level associated with travelling are shown in Table 49. Users in all LLs do not expect an effect on their stress, as the weighted average of responses in the third questionnaire was close to the neutral rating, 0.19 in Catalonia, 0.46 in Berlin and 0.17 in Trikala. Again, no differences between responses by the "Same users" in each LL were found using the Wilcoxon signed-rank test.

Table 49. Estimations about impact on stress associated with travelling (-2: Will radically increase, +2: Will radically decrease)

		All users		Same users	
Living lab	Time point	N	Weighted Average	N	Weighted Average
Catalonia	SEQ-1	85	0.33	61	0.27
	SEQ-2	65	0.24	61	0.29
	SEQ-3	62	0.19	61	0.22
Berlin	SEQ-1	22	0.55	11	0.72
	SEQ-2	13	1.00	11	1.09
	SEQ-3	13	0.46	11	0.72
Trikala	SEQ-1	23	0.04	23	0.04
	SEQ-2	23	0.13	23	0.13
	SEQ-3	23	0.17	23	0.17

The users' estimations about the impact of MyWay on the time required to reach their destination are shown in Table 50. Users in all Living Labs do not expect an effect on this, since their responses were close to the neutral (no effect) response. The weighted average of responses in the third questionnaire was 0.37 in Catalonia, 0.30 in Berlin and 0.08 in Trikala. Again, no differences between responses by the "Same users" in each LL were found using the Wilcoxon signed

Table 50. Estimations about impact on time required to reach destination (-2: Will radically increase, +2: Will radically decrease)

		All users		Same users	
Living lab	Time point	N	Weighted Average	N	Weighted Average
Catalonia	SEQ-1	85	0.33	61	0.24
	SEQ-2	65	0.2	61	0.24
	SEQ-3	62	0.37	61	0.34
Berlin	SEQ-1	22	0.27	11	0.0
	SEQ-2	13	0.38	11	0.36
	SEQ-3	13	0.30	11	0.27
Trikala	SEQ-1	23	0.08	23	0.08
	SEQ-2	23	0.21	23	0.21
	SEQ-3	23	0.08	23	0.08

To support these estimations, an analysis of 6790 trip plan responses, which were returned during autumn 2015 with OK status code in the Catalonia LL, was conducted. The aim of this analysis was to survey the impact on trip duration of the intermodal routing done by the metaplanner. An intermodal trip plan can employ any combination of fixed-schedule public transport modes (e.g., bus, underground, tram, train, ferry), fixed-station free-floating modes (e.g., shared bikes), and unrestricted free-floating modes (e.g., walk, bike, car, taxi). There were 1084 trip plan responses (16%) without a public transport only trip plan. In 341 cases (31% of trip plan responses without public transport only trip plans), the metaplanner returned an intermodal trip plan from the origin to the destination (e.g., bike and train). This shows that the metaplanner is able to return solutions in cases when some subplanner is not able to return one. In addition, the durations of public transport only and intermodal trip plans were compared, using 2543 trip plans (37%) where both types of trip plans have been returned. The intermodal trip plans had by 25% shorter duration than public transport only trip plans. This signifies that MyWay metaplaning approach is able to help in the situations where there is no public transport only plan and also it delivers intermodal trip plans with shorter duration than public transport only plans. This finding is in support of the users' perceptions about trip times as presented in the previous table.

The users' estimations about the impact of MyWay on fuel consumption are shown in Table 51. Users in all Living Labs do not expect an effect on fuel consumption, since their responses were close to the neutral (no effect) response. The weighted average of responses in the third questionnaire was 0.37 in Catalonia and 0 in Berlin and Trikala. Again, no differences between responses by the "Same users" in each LL were found using the Wilcoxon signed-rank test.

Table 51. Estimations about impact on fuel consumption (-2: Will radically increase, +2: Will radically decrease)

		All users		Same users	
Living lab	Time point	N	Weighted Average	N	Weighted Average
Catalonia	SEQ-1	85	0.28	61	0.26
	SEQ-2	65	0.26	61	0.24
	SEQ-3	62	0.37	61	0.36
Berlin	SEQ-1	22	0.18	11	0.18
	SEQ-2	13	0.38	11	0.45
	SEQ-3	13	0.0	11	0.0
Trikala	SEQ-1	23	0.00	23	0.0
	SEQ-2	23	0.09	23	0.09
	SEQ-3	23	0.0	23	0.0

The users' estimations about the impact of MyWay on the usage of private car and public transportation are shown in Table 52. Users in all LLs do not expect a change in number of journeys by car, since the weighted average of responses is close to the neutral one, 0 meaning no change. The weighted average of responses in the third questionnaire was 0.25 in Catalonia and 0 in Berlin and Trikala. Again no change is expected in the frequency of usage of public transportation. The weighted average of responses in the third questionnaire was 0.29 in Catalonia, 0.46 in Berlin and 0.04 in Trikala. No differences between responses by the "Same users" in each LL were found using the Wilcoxon signed-rank test.

Table 52. Estimations about impact on number of journeys by car (-2: Will radically increase, +2: Will radically decrease) and by public transportation (-2: Will radically decrease, +2: Will radically increase)

		Private car				Public Transportation			
		All users		Same users		All users		Same users	
Living lab	Time point	N	Weighted Average	N	Weighted Average	N	Weighted Average	N	Weighted Average
Catalonia	SEQ-1	85	0.26	61	0.24	85	0.25	61	0.26
	SEQ-2	65	0.18	61	0.21	65	0.32	61	0.27
	SEQ-3	62	0.25	61	0.24	62	0.29	61	0.27
Berlin	SEQ-1	22	0.27	11	0.27	22	0.27	11	0.54

Trikala	SEQ-2	13	0.31	11	0.36	13	0.46	11	0.54
	SEQ-3	13	0.0	11	0.27	13	0.46	11	0.72
	SEQ-1	23	0.13	23	0.13	23	0.08	23	0.08
Trikala	SEQ-2	23	0.04	23	0.04	23	0.08	23	0.08
	SEQ-3	23	0.00	23	0.00	23	0.04	23	0.04

The users' estimations about the impact of MyWay on their comfort while travelling are shown in Table 53. No effect on comfort was expected by users and no differences between responses by the "Same users" in each LL were found using the Wilcoxon signed-rank test.

Table 53. Estimations about impact on comfort while traveling (-2: Will radically decrease, +2: Will radically increase)

Living lab	Time point	All users		Same users	
		N	Weighted Average	N	Weighted Average
Catalonia	SEQ-1	85	0.39	61	0.32
	SEQ-2	65	0.32	61	0.31
	SEQ-3	62	0.32	61	0.32
Berlin	SEQ-1	22	0.59	11	0.81
	SEQ-2	13	0.54	11	0.63
	SEQ-3	13	0.38	11	0.72
Trikala	SEQ-1	23	0.08	23	0.08
	SEQ-2	23	0.08	23	0.08
	SEQ-3	23	0.13	23	0.13

6.2 Findings from stakeholders' interviews

In the second round of stakeholders' survey, there were interviews with 2 stakeholders in Berlin, 4 in Catalonia and 3 in Trikala, who were presented with the integrated MyWay application. Their responses are included in Annex A.

Most interviewees had a positive impression of the technical qualities of MyWay. Figure 13 presents some verbatim extracts that illustrate the typical responses to the question "How do you evaluate MyWay technically?". One interviewee noted that the geographic coverage of the App is restricted to the Living Labs at the moment, and that this is a short-coming. Another noted that the journey plan suggestion algorithm needs further re-

finement in relation to inter-modality, as some suggestions are unrealistic (e.g. an unreasonable number of interchanges). A useful suggestion was that the App should 'hide' options that are unavailable in a specific location, to make the App less cluttered. The usability and intuitiveness was regarded as good, though one interviewee felt that some improvements were necessary for the product to be more suited to users new to Smartphones.

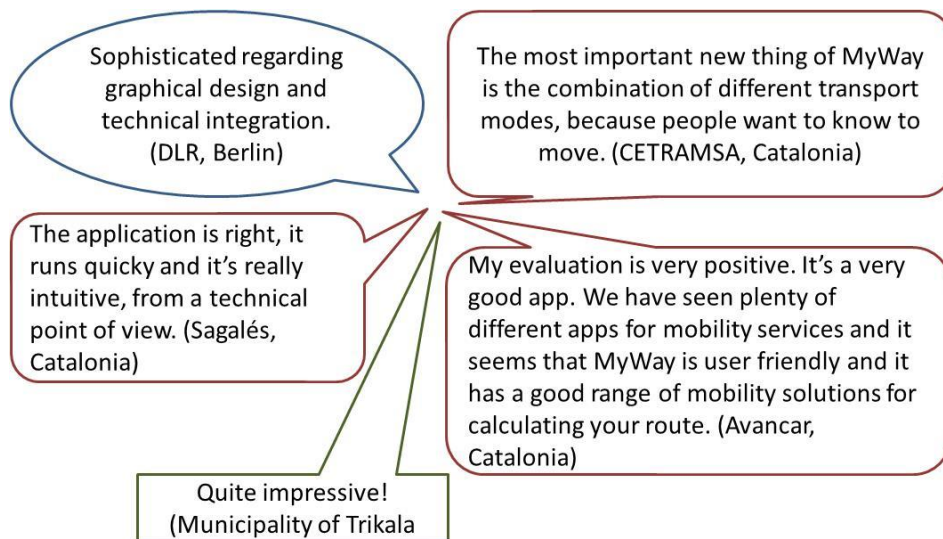


Figure 13. Indicative responses to the question ‘How do you evaluate MyWay technically?’

The majority of interviewees, 1 out of 2 in Berlin, all 4 in Catalonia and 2 out of 3 in Trikala, feel that people would use MyWay. The ‘No’ responder in Berlin explained that in the context of the Berlin Living Lab, the offer for ‘ride-sharing’ was not explained enough, so that the App didn’t add as much value as it could in a competitive marketplace. Similarly, the explanation for the ‘Maybe’ answer in Trikala focused on the difficulty of recruiting users in a competitive App market, especially getting users to switch. This difficulty was mentioned in the answers to a number of questions; however, this is a problem of marketing as much as of quality, and is one that all new Apps have to face.

Figure 14 illustrates the typical reasoning of interviewees who think that people would use MyWay.

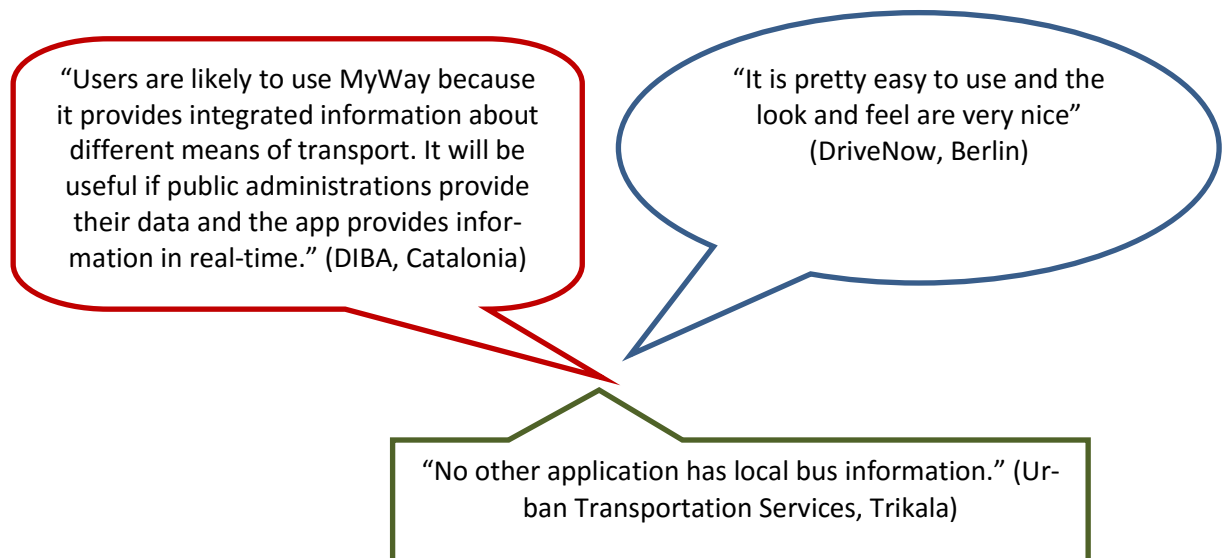


Figure 14. Indicative responses to the question "Why will people use MyWay?".

All interviewees think that MyWay has benefits for the user. This supports the idea that MyWay has achieved very good user-centricity. Figure 15 shows some typical verbatim extracts explaining the interviewees' reasoning for thinking that MyWay will be beneficial for users. However, some interviewees also recognised that it is hard to get users to adopt new Apps, particularly if they are already using a different App.

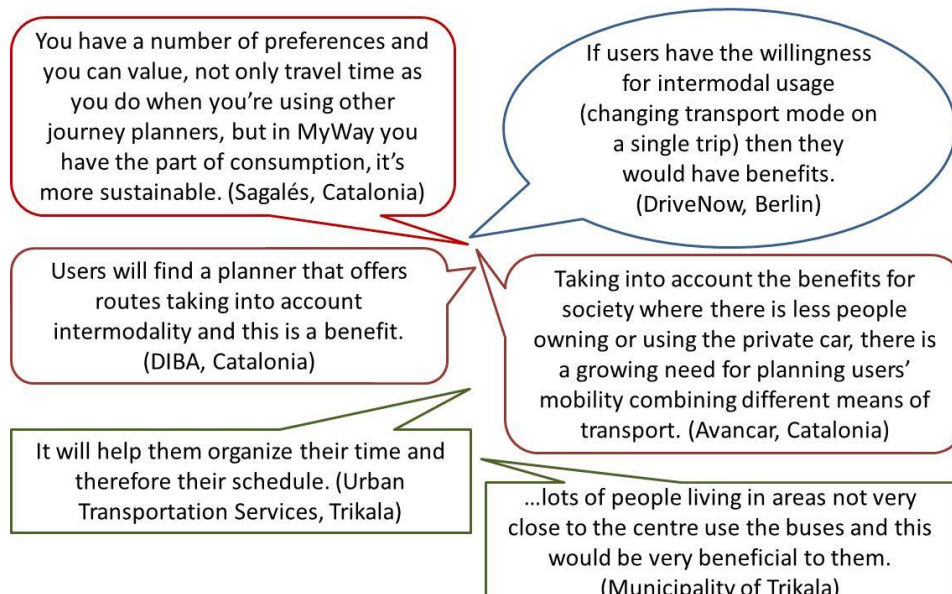


Figure 15. Responses to the question “Why is MyWay beneficial for users?”.

Based on the responses to the remaining questions, a SWOT analysis was conducted and is presented in Figure 16.

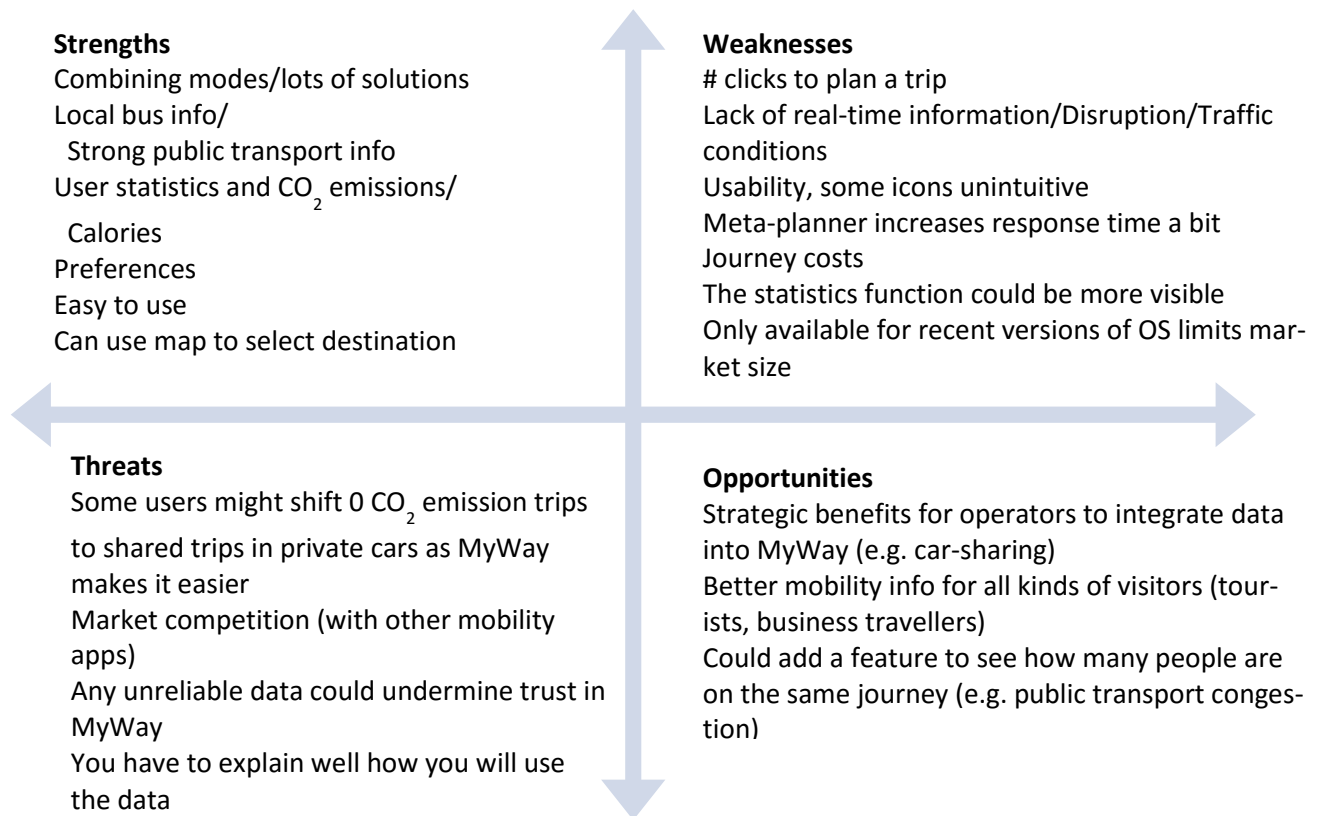


Figure 16. SWOT analysis compiled from the remaining questions

Other important comments, positive and negative ones, are listed below.

- Depending on the integration of how car-sharing vehicles will or could be integrated – the calculation of the potential fares for a route alternative which includes car sharing is critical [including any commission payable to the app provider]. (DriveNow, Berlin)
- The users’ preferences (functionality) are also interesting but I am not sure if citizens will use it in the end. (CETRAMSA, Catalonia)
- Having a very good product is not enough for making sure users will use it. It is needed a strong marketing plan behind on top of an excellent product. (Avancar, Catalonia)

- It includes all of different operators and provides all travel options, combining different modes of public transport. This is a distinct advantage in terms of public transport. My Way is good for public transport. (Sagalés, Catalonia)
- You have a number of preferences and you can value, not only travel time as you do when you're using other journey planners, but in MyWay you have the part of consumption, it's more sustainable. (Sagalés, Catalonia)
- Usability could still be improved; it would be good to put all trip options on the same map. (DIBA, Catalonia)
- There are not traffic conditions which I think it's a very important part in order to take decisions when you're planning a trip. (Sagalés, Catalonia)
- MyWay could be the public transport showcase. It can unveil new transport services. There is a benefit linked to tourism. Whether tourists use MyWay and see that there is a good public transport network, it can encourage them not to rent a car, for example (DIBA, Catalonia).
- If we could have an option where the tracking is always activated, you could have a group of people reporting all their movements so the city officials could see for which kind of trips people are using the car, for example. (Avancar, Catalonia)
- It could be a relevant app for mobility. I think that the most powerful part of the app is the emissions and calories tracking. That opens an interesting opportunity for developing other things. Because the rest is a commodity, the rest is not new. (Avancar, Catalonia)
- You have to explain well how you will use the data. (CETRAMSA, Catalonia)

7. CONCLUSIONS

The aim of this work was to evaluate the technical performance of the integrated MyWay system and to detect any issues with its usability for its future improvement and optimisation. An additional aim was to evaluate the users' acceptance of MyWay and their estimations and expectations about its impact. The results of this analysis are useful data and input for the necessary assumptions needed for the business modelling and exploitation activities of MyWay.

The evaluation was based on collecting objective data and subjective opinions by users, recruited in the three Living Labs of the project, Catalonia, Berlin and Trikala. Users were asked to use MyWay as they would wish in their everyday life. Apart from that, there was a specific study on usability issues, conducted with a small number of users in the three Living Labs. They were instructed to follow specific scripts, the aim of which was to get more detailed and rich descriptions of usability issues, if such were indeed detected. Finally, the study of acceptance and expected impact of MyWay was complemented via detailed interviews with a small number of stakeholders in each Living Lab, again aiming to collect more detailed and richer material to be used for the further optimisation and exploitation of MyWay after the project end. In the following the main findings of this work will be discussed in relation to the hypotheses included in section 2 and detailed in Deliverable 6.1.

It must be noted that the present trials were conducted in a Living Lab setting, and therefore it was not possible to control the sample size and synthesis and the variables in the same way as this can be done in an experimental or laboratory setting. Still, the real world tests provide ecological validity which cannot be achieved by experimental settings. Since the number of users who participated in the tests per Living Lab was rather low (compared with the total population), the following findings should be considered with care and they should be interpreted as trends, which should be verified with bigger number of users, using MyWay for longer periods of time and in different geographical regions, before any definite conclusions can be drawn.

Still, one should consider that MyWay was being compared against mature products, which are generally available in the market after years of design, development and after several software updates to fix bugs, therefore they are very stable. In this notion, the results obtained seem very encouraging as regards the performance of MyWay and the users' perceptions about it.

7.1 Technical performance

The median MyWay response time was 5 s in Catalonia, 6.1 s in Berlin and 0.1 s in Trikala. The response time depended on the network area covered and on the number of subplanners being integrated, this is why it was higher in Berlin and Catalonia than in Trikala. The users in all Living Labs perceived the MyWay response time as comparable to the response time of other commercial and mature planners they were currently using. The weighted average of their responses to the question 'How do you evaluate the

MyWay response time (compared to other planners)?" in the third SEQ was close to the neutral (similar) rating, i.e. -0.05 in Catalonia, -0.31 in Berlin and 0,13 in Trikala. These findings **support** the hypothesis "**TH1**: Users perceive the MyWay response time to their request as normal / similar to that of other planners". This is a very encouraging outcome, since users were comparing MyWay with mature products with long market presence.

One of the main objectives of MyWay is to promote intermodal mobility, instead of a private car.. Analysing trip plans generated by single subplanners and by the Metaplanner for 1000 random origin-destination pairs in each LL and for 6790 real trip plans from Catalonia, it was shown that in 4% to 12% of requests the Metaplanner did propose intermodal plans that were **better** than single-modal ones as regards travel time, price or emissions. In 85% to 92% of requests the intermodal plans were similar to the single-modal ones, but they were new plans, thus extending the travel options available to the user. This analysis showed that the Metaplanner is able to help in cases where there is no public transport-only plan provided by single subplanners. The Metaplanner can offer extra intermodal options, especially for longer trips, which means that the user can use, for example, bike and train instead of car for the whole journey. Furthermore, the Metaplanner can deliver intermodal trip plans with noticeably shorter duration than public transport only plans. These findings show that the Metaplanning approach is a clear added value of MyWay, and should be used in promotion and exploitation of MyWay.

The people who participated in the tests perceived the information provided by MyWay as of similar reliability to that of other commercial planners. The weighted average of their responses to the question 'How reliable is the information provided by MyWay (compared to other planners)?" in the third SEQ was close to the neutral (similar) rating, i.e. 0 in Catalonia, 0.15 in Berlin and 0,52 in Trikala. This finding **supports** the hypothesis "**TH2**: MyWay information is reliable / as reliable as that of other planners being used by the users over the same period." This is once again very encouraging, since users were comparing MyWay with mature products with long market presence.

The participants in the SJPs in all LLs stated that the journey plans 'mostly' met their expectations. Also, in a comparative analysis of the results obtained for 8 trip requests in Catalonia by different trip planners, MyWay always proposed as first option the itinerary which was suggested by the local users as the optimum one. This was not always the case for the other trip planners. Still during the Phase 2 tests, users responded that MyWay suggestions are in accordance with their needs and expectations similarly to the suggestions by other commercial and mature planners. The weighted average of their responses to the question 'Are the MyWay suggestions (more) in accordance to your needs and expectations (than the suggestions by the other planners)?" in the third SEQ was close to the neutral (similar) rating, i.e. 0.09 in Catalonia, 0.46 in Berlin and -0,17 in Trikala. Despite the first two findings, the Phase 2 results do not support the hypothesis "**TH4**: MyWay suggestions are more in accordance to users' needs and expectations than those of other planners that the users utilised over the same period." Still, the finding is encouraging, as the MyWay suggestions are equally rated as those of other planners.

The program exceptions in the MyWay backend were very low, only 0.2% of requests in Catalonia resulted in exception, none did so in Berlin and Trikala. The MyWay exceptions were much lower than the exceptions of the sub planners themselves, which indicates the added value of the MyWay approach, which ensures the robustness of the trip-planning functionality. Moreover, during the Phase 2 tests, users responded that MyWay exceptions were as frequent as those of other commercial and mature planners. The weighted

average of their responses to the question ‘Were any encountered problems more frequent than that of other planners?’ in the third SEQ was close to the neutral (similar) rating, i.e. -0.3 in Catalonia, -0.07 in Berlin and -0,05 in Trikala..Therefore, one can conclude that the findings support the hypothesis “**TH5:** MyWay fails to provide a response in less than 5% of requests.” Again, this finding is encouraging as regards the technical performance of MyWay and the added value of the metaplanning approach.

It must be noted that due to its concept, the MyWay performance depends on the performance of the linked subplanners, so the performance of the subplanners has to be continuously monitored. For the prototype version of the MyWay platform, there was a timeout threshold set, after which the subplanners that have not responded are ignored. This approach has both advantages and disadvantages. The advantages are that it is a very simple solution that reacts in real-time to the status of individual subplanners, i.e. a subplanner is used as soon as it is available online. On the other hand, the existence of the timeout can prolong the response time of the MyWay with no final benefit for the user. Although this solution was sufficient for the prototype version of MyWay platform, different approaches are envisaged for the production version. First, multiple subplanners for one mode of transport will be used (e.g., Moute and Google Directions API for public transport trips) and MyWay will switch between them according to their availability. Second, a better scheme to monitor the availability of subplanners will be implemented, as follows. If there is a timeout for a specific subplanner, the system will mark this subplanner as unavailable (it can also automatically send an alert to the provider of the subplanner). Then, the metaplanner will not query this subplanner, in order to shorten response time. In parallel, a thread to detect when the subplanner will become available online will also start. As soon it is detected that the subplanner is online again, it will be marked as available. This approach will give better robustness to MyWay with respect to unavailable subplanners (as it will be possible to switch to an alternative subplanner), it will shorten response times when a subplanner is offline, and it will enable the better monitoring of the service of the integrated subplanners (e.g., downtime statistics per subplanner). Considering the feedback received by users during the present tests, the status of the subplanners should be apparent to the users, so that they may understand the cause of possible problems in the MyWay functionality. Users in all LLs responded that similar trips lasted the same when using MyWay. The weighted average of their responses to the question ‘Do you think that the same trips when done following MyWay advice lasted less than when not using MyWay?’ in the third SEQ was close to the neutral (the same) rating, i.e. 0.22 in Catalonia, 0.46 in Berlin and -0,13 in Trikala. The findings of this survey do not support the hypothesis “**TH6:** Users perceive that the mean journey time is reduced for similar trips compared with the “without MyWay” condition”.

7.2 Usability

The users’ responses to the usability questions were coded in a -2 (most negative answer) to +2 (most positive answer). Therefore, if the weighted average of responses is positive, this means that the majority of users have given responses greater or equal to the neutral response. 292 out of 329 completed subjective evaluation questionnaires were completed by users who were also using other mature planners. Their responses were a comparison of MyWay performance and usability with that of the other commercial planners they are currently using. Therefore, the neutral response, for example “I think

that I would use MyWay as frequently as the other planner” or “MyWay is as easy to use as the other planner”, suggests that the user is satisfied with the MyWay usability. This is especially true in the light of the fact that MyWay competes with already established commercial and mature planners and that users indicated that it is difficult to make someone change from one journey planner he/she is used to, to another. Therefore, a weighted average of responses which is greater or equal than 0 corresponds to the majority of users being satisfied with MyWay usability. The weighted average of users’ responses on several usability questions in the final questionnaire of Phase 2 is shown in Figure 17.

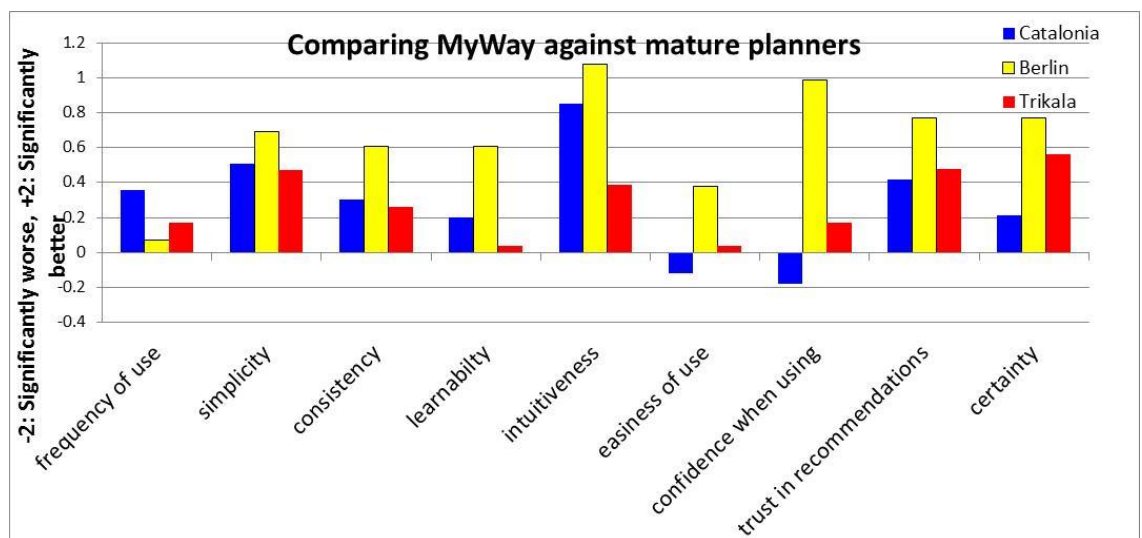


Figure 17. Comparing MyWay usability against mature planners

According to this Figure, the users in all Living Labs stated that they would like to use MyWay as frequently as other mature planners, they considered it as of equal simplicity and as consistent as other mature planners, they thought that people would learn to use it as quickly as other planners (more quickly in Berlin), and they thought that MyWay is rather more intuitive than other mature planners. Users in all Living Labs responded that MyWay is as easy to use as other planners and that they felt as confident (rather more confident in Berlin) when using MyWay as when using other planners. Users in all Living Labs stated that they trusted the MyWay journey recommendations as much as other planners (rather more in Berlin) and that they felt as sure that their journey would go as planned when using MyWay (rather more sure in Berlin). The findings support the hypothesis “**Ush1**: More than 50% of users are satisfied by the MyWay usability.”. The findings are very positive, considering the MyWay was compared against mature products.

The responses on usability questions at several time points along the evaluation period, at the end of Pre-phase, Phase 1 and Phase 2, are shown in Figure 18. The weighted average of responses got more positive with time, still this was not statistically significant. Therefore, the results of this study do not support with confidence the “**Ush2**: Users’ satisfaction by the MyWay usability increases with time.”

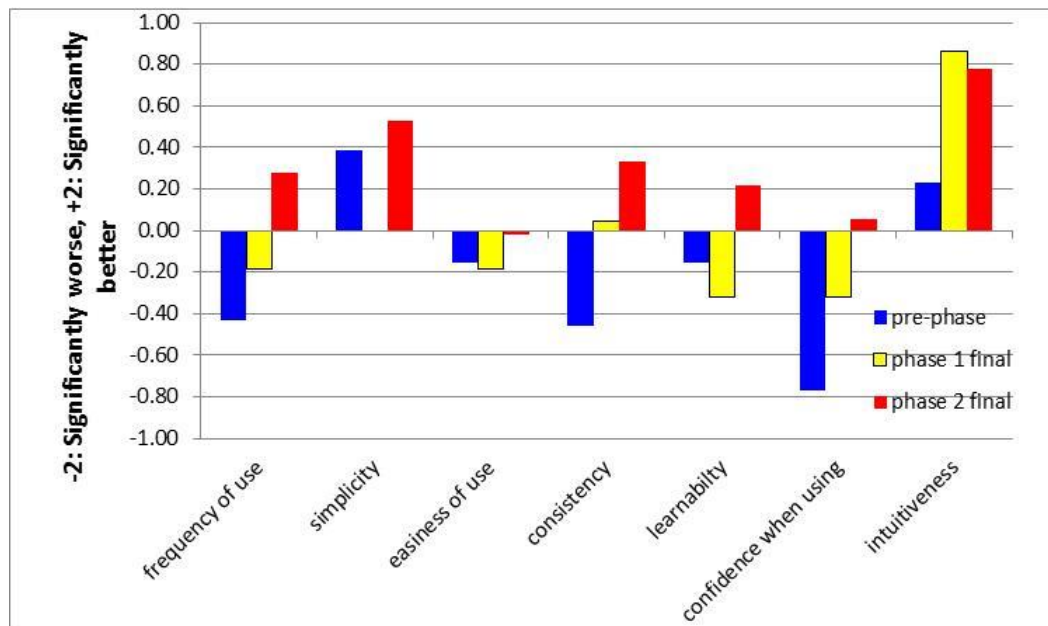


Figure 18. Usability ratings with time

7.3 Acceptance

Not enough data could be collected in this study to evaluate the hypothesis “**UAH1:** Frequency of MyWay use increases with time”. Indeed, the majority of requests to MyWay were made by anonymous users, while the requests by authenticated users were limited, so it was not possible to analyse the frequency of using MyWay per user with time.

Specifically, users indicated that they were reluctant to use the TripFollowing functionality, mainly because it stopped in cases of low GPS signal. Some future work is needed to improve this functionality and make it more appealing to users. This may include:

- Utilize improved localization sources: Due to the dependence on the GPS signal, the TripFollower functionality is severely limited underground (e.g. subway, metro, ..) or in the presence of obstructions (e.g. tunnels, urban canyons, etc). Some alternative localisation method should be used in these cases, such as WiFi or UWB localization, to significantly improve the user's perception of functionality and reliability of the offered service.
- Improve usability: The user interface and work flow of using the TripFollower service should be further optimised. For instance, the service could be further automated and run in the background without requiring frequent user input. Also, a balance should be set between providing an optimal amount of helpful notifications without irritating the user.
- Default activation: When the default setting is “deactivated”, several users might neither know about nor actively use the functionality. The default state of the TripFollower could be set to “activated”, of course taking privacy considerations into account.

- Selective activation according to trip type: As the usefulness of the TripFollower is higher in some types of trips, e.g. multi-modal public transport trips, it could be selectively activated in these cases. In other cases, e.g. in single-modal car trips, it can be automatically deactivated, so as not to bother the user.

Despite this, the number of MyWay application downloads is increasing and continued even after the project end. Also, users in all Living Labs stated that they used MyWay at the same frequency as other mature planners. The weighted average of their responses to the question ‘During the last period I have been using the MyWay system more frequently than other planners?’ in the third SEQ was close to the neutral (the same) rating, i.e. -0.05 in Catalonia, 0.30 in Berlin and -0,13 in Trikala. These findings are very positive.

The partners have concluded that the hypothesis **UAH1** is not very relevant at the level of individual users. One should consider that MyWay is not meant to be used continuously. It is a trip planning application and the user will normally need it when planning an unfamiliar trip or when there is a disruption in the traffic and mobility network. A more relevant hypothesis for future studies of MyWay would be to evaluate whether there is a steady and increasing interest from new users to download the MyWay application in their mobile devices. This is supported by the data from the present study.

Users in all Living Labs rated MyWay as rather useful and satisfying. Their ratings increased with time point in all Living Labs, as shown in Figure 19. Still, no statistically significant difference was found. Therefore, the results of this study do not support with confidence the hypothesis “**UAH2**: Users’ perceived usefulness of and satisfaction with MyWay increase with time”.

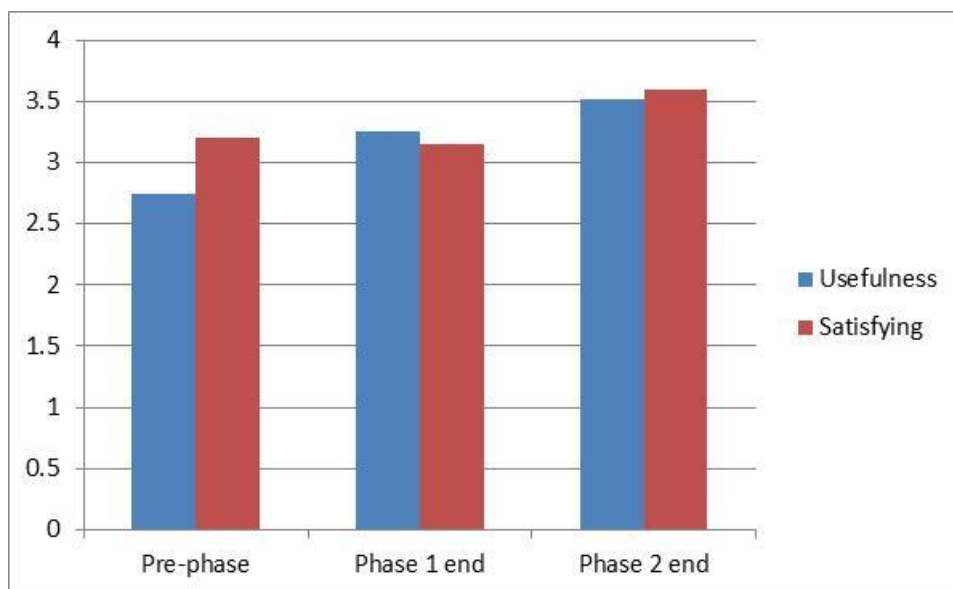


Figure 19. Acceptance ratings with time

7.4 Expected Impact

The users' attitudes towards MyWay and their expectations about its effects are shown in Figure 20. Their immediate reaction to MyWay was rather positive, and their overall satisfaction was between neutral and rather positive. Users in Catalonia and Trikala saw a moderate benefit, and users in Berlin saw a large benefit of having access in MyWay. Users did not expect any effect by MyWay on their stress associated with travelling and on their comfort while travelling. Users in Catalonia expected a rather positive effect on their possibility to choose optimal route according to their preferences, but not in Berlin and Trikala. Also, users did not expect an effect by MyWay on the time required to reach destination and fuel consumption when using MyWay.

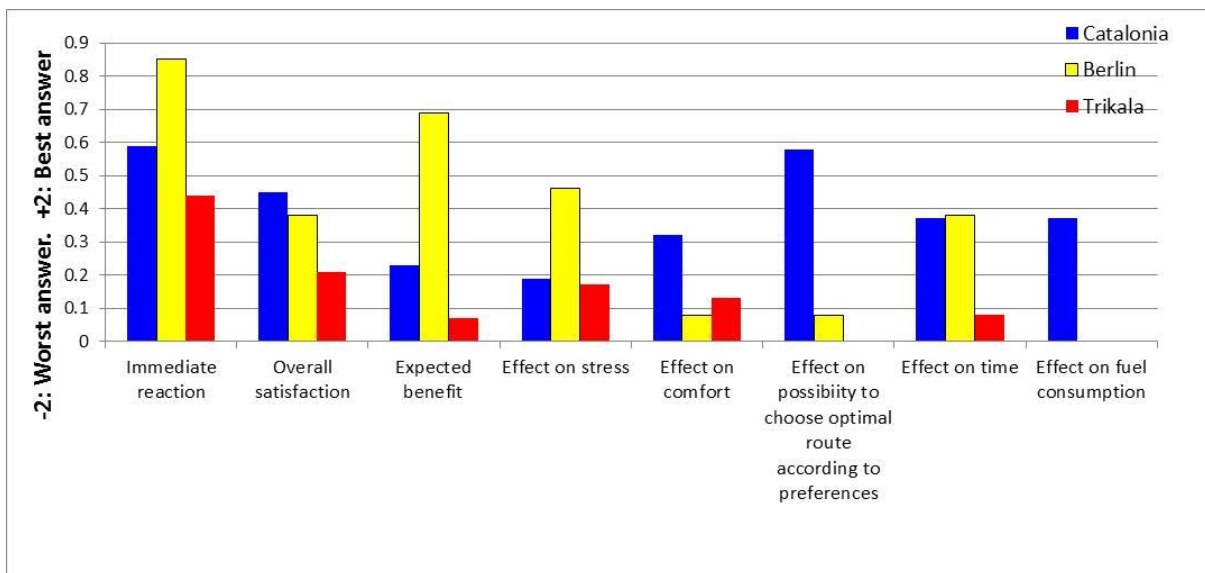


Figure 20. Attitudes towards MyWay and expected effects per LL

The weighted average of users' responses with time are shown in Figure 21. The responses are better at the end of Phase 2 than in the Pre-phase, still no significant difference between time points was detected. So, the users' attitude and motivation towards MyWay are positive, but the findings of this study do not support the hypothesis "SEH1: Attitude and motivation towards MyWay increases with time".

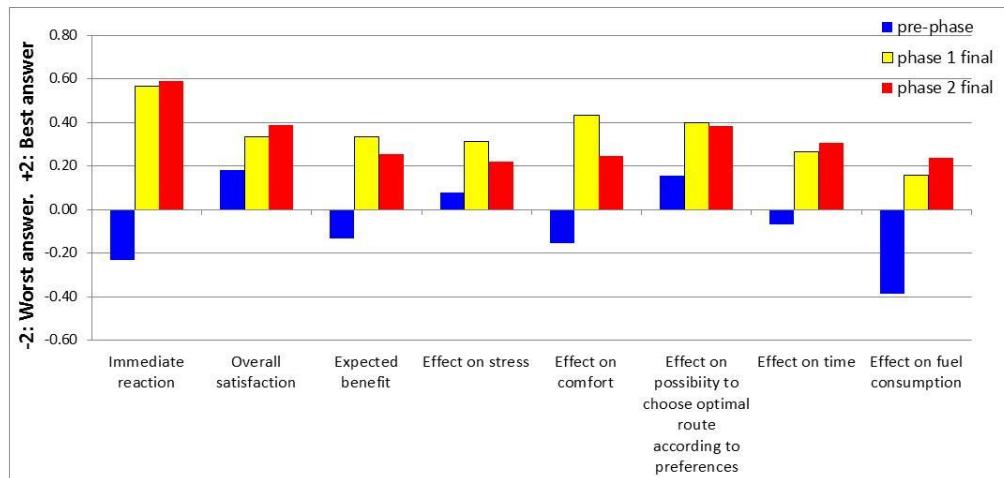


Figure 21. Attitudes towards MyWay and expected effects with time

In Catalonia and Trikala the users responded that they used less often the private car when using MyWay than before using MyWay (in the background questionnaire), as shown in Figure 22. Still, this difference was not statistically significant. In Berlin the users' statements about frequency of usage of private car do not seem to change. Additionally, users' responded that they did not expect any significant change in the number of journeys by car when using MyWay. The weighted average of their responses in the third questionnaire very close to neutral, 0.25 in Catalonia, 0 in Berlin and 0.1 in Trikala. Therefore, the findings of this study do not support with confidence the hypothesis **"SEH2: Users use private car less frequently in the "with MyWay" condition.**

Although the results of this study are based on subjective data collected by a limited number of users and have to be verified with more users in other regional areas but also with objective data of real usage of transport modes, they support the argument that the availability of information about environmentally-friendly transport modes via a multimodal trip planner, is rather not enough to achieve a shift of travellers to such modes. This finding is in accordance to previous studies of multimodal trip planners [Skoglund and Karlsson, 2012], [Simão, 2015]. Furthermore, these findings are in line with the previously reported role of habit in modal choice, which poses a psychological barrier to the effective use of information [Aarts, Verplanken and van Knippenberg, 1997]. It seems that transport planning authorities should adequately design such services and integrate them with the rest of the traffic network, for them to be widely used by travellers.

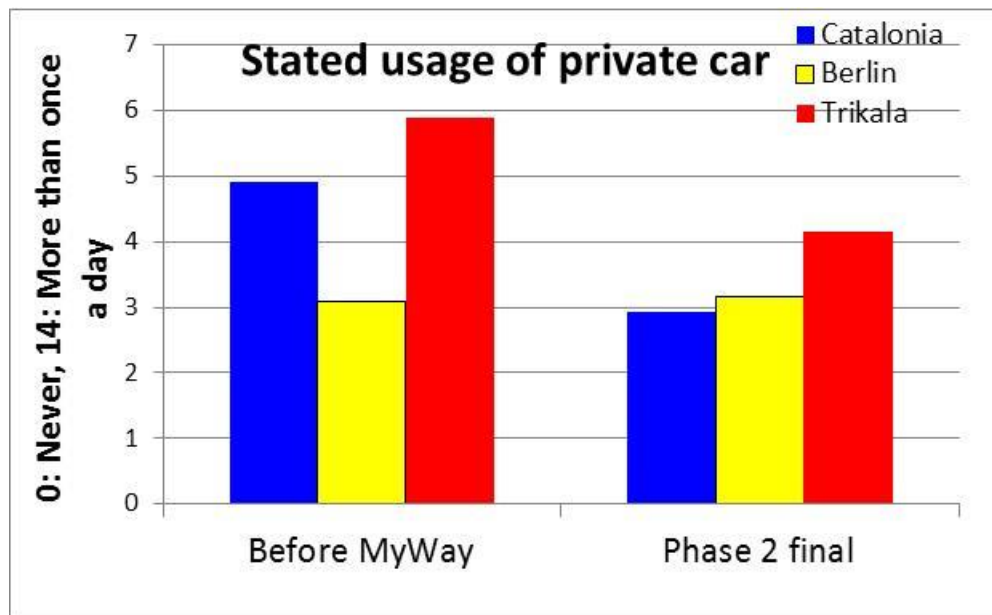


Figure 22. Stated usage of private car with time

In conclusion, the MyWay evaluation hypotheses and the outcomes of this study are summarised in Table 54.

"TH1: Users perceive the MyWay response time to their request as normal / similar to that of other planners"	Supported
"TH2: MyWay information is reliable / as reliable as that of other planners being used by the users over the same period."	Supported
"TH3: MyWay suggestions are followed in at least 70% of requests, in which users have accepted to be tracked."	Not enough data collected due to connectivity issues
"TH4: MyWay suggestions are more in accordance to users' needs and expectations than those of other planners that the users utilised over the same period."	Not supported
"TH5: MyWay fails to provide a response in less than 5% of requests."	Supported
"TH6: Users perceive that the mean journey time is reduced for similar trips compared with the "without MyWay" condition".	Not supported
"UsH1: More than 50% of users are satisfied by the MyWay usability."	Supported

“Ush2: Users’ satisfaction by the MyWay usability increases with time.”	Not supported
“UAH1: Frequency of MyWay use increases with time”.	Not enough data collected
“UAH2: Users’ perceived usefulness of and satisfaction with MyWay increase with time”.	Not supported
“SEH1: Attitude and motivation towards MyWay increases with time”.	Not supported
“SEH2: Users use private car less frequently in the “with MyWay” condition”	Not supported

Table 54. MyWay hypotheses and outcome of evaluation

Finally, the testers who participated in the Scripted Journey Plan tests made some valuable observations and comments as regards MyWay usability, and these should be considered in the future development efforts after the project end. Suggestions included, among others, to add timelines, to add an overview about linked accounts, the possibility of a history of routes and the possibility to propose more than one car route.

Also, the stakeholders made some useful comments about the reasons why users would use MyWay, its strengths and weaknesses, opportunities and threats. According to their opinion. MyWay may provide strategic benefits for operators to integrate their data, for example about car-sharing, into MyWay, it can be beneficial for all types of city visitors, not only commuters, but also tourists and business travellers, and the data maintained and collected by MyWay can be linked to the urban mobility plans of each city. Caution should be paid, among others, to the reliability of data provided by the operators and integrated in MyWay, as unreliable data may undermine the user’s trust in MyWay. Data protection issues should be carefully considered, before making use of data collected by MyWay. All these comments and suggestions should be considered in the exploitation strategy of MyWay.

As a conclusion, although the results are based on data collected by a limited number of users and have to be verified with more users and in other regional areas, they do support the added value that MyWay offers to the travellers, as it may provide intermodal plans which are better than single modal ones or which extend the users’ options. Considering users’ perceptions and expectations, MyWay has a good exploitation potential. The findings provide an insight into issues that have to be considered in the further development and exploitation of MyWay and can serve as a basis for defining the business and exploitation strategy for the MyWay application in the future.

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ANNEX 1: STAKEHOLDERS' INTERVIEWS

BERLIN (Extend Phase 1 breadth – no VBC question)

Question	DriveNow	DLR – Institute for Transport Research
1: How do you evaluate MyWay technically?	MyWay has a final stage of development, looks like a real product. Routing is restricted to a certain area (Berlin) – if you want to go further the routing doesn't work. If you start the app the first time, and your current position is not within the area of Berlin/Brandenburg, the region of Barcelona will be displayed and not your actual ones [this interviewee tested the app from Munich]	Sophisticated regarding graphical design and technical integration. Sometimes long timings for intermodal route calculation (combination of different transport modes on one trip). Too many icons for routing preferences and modes of transport – in addition too manifold icons: pilot specific adaptations are welcome. [Interviewer note: Currently the app shows all trip preference icons in every Living Lab, even if certain functions are not supported in that Living Lab's pilot]
2: Do you think users are likely to use MyWay?	Yes	No
Why?	It is pretty easy to use and the look and feel are very nice	Personally, the advantage of ride sharing is not clear and does not provide added value. A lot of existing/parallel strong alternative planners and apps on the market.
3 Do you think MyWay will benefit users?	Yes	Yes
Why?	If users have the willingness for intermodal usage (changing transport mode on a single trip) then they would have benefits. The indication of the price for all route alternatives and modes is important for the user. However, it is hard to get users to switch apps – strong marketing strategies are necessary.	Yes, the same as other apps. If a huge group of users offer ride sharing journeys, other users would benefit, but see also answers to question 2.
4a: What do you think of the VBC function?		
4b: How could sustainable transport functions evolve/be improved?		

Question	DriveNow	DLR – Institute for Transport Research
5: Strengths/weaknesses compared to other planners	Strengths: Definitely the design! The amount of trip preferences is great, to enter the app seems very easy, nice thing is the calories counter – never seen before in other route planner apps	Strengths: integration of established modal routers: to use the existing expert routing services for each mode of transportation (VBB for PT; tomtom for car, etc)
	Weaknesses: Sometimes not all icons for the transport modes or the trip preferences are completely clear to understand.	Weaknesses: the computation of intermodal routing procedures in terms of time consumption till a complex calculation is realised. Time consumption raises because of the technical complexity to calculate intermodal routes – a difficult challenge at present.
6: Strategic benefit for organisation	None at present for car-sharing operator DriveNow; we don't support 'aggregator' app which include more car and bike-sharing opportunities than our own vehicles.	Technical: Testing new technological breakthroughs to learn at which points further research is needed. Methodologically: user recruitment, collaboration between the Streetlife Project and MyWay on project level and on local Living Lab level.
7a: Regional strategic benefit in transport policy and provision.	A nice feature would be to see how many people are on the same journey (e.g. showing public transport congestion); this could be extremely beneficial for the local region. It is a nice aggregator app for the local Living Lab – is it convenient for the public transport operators and users?	Hardly improvement/deterioration of generating a strategic benefit to the local transport policy goals through an integration of ride sharing in such a system [Interviewer note: This research fellow does not see a strategic benefit regarding the local transport policy (of Berlin) if the MyWay App combines existing transport modes (car, walk, bike and PT) with the modern and innovative alternatives like the ride sharing from the operator flinc.]
7b: Regional strategic benefit in attracting investors?	No answer/Not applicable	If it had a strategic benefit, provide and operator like flinc could think about a business case when they integrate their services in other aggregator apps like MyWay.
7c: Regional strategic benefit in building a positive local image?	Especially for tourists, visitors and business travellers	At most for flinc or other local operators, otherwise not.
8: Other opportunities from market introduction?	No answer/Not applicable	The integration of car sharing operators into the MyWay system.

Question	DriveNow	DLR – Institute for Transport Research
9: Threats from market introduction?	No answer/Not applicable	The shift potential could be a problem – there is a danger that zero CO2 emission trips made by walk or bicycle are replaced by shared trips in private cars.
10a: Risks arising from MyWay for organisation	Depending on the integration of how car-sharing vehicles will or could be integrated – the calculation of the potential fares for a route alternative which includes car sharing is critical. The payment procedures is critical too – how could or will the roaming of trips within the platform done by car sharing. [Interviewer note: She is asking about the handling of costs and real euros after finishing a trip made by car sharing. She as an operator will know, how the mechanism is if user book cars in an app like MyWay. If this handling of booking vehicles is possible, than she expects that the provider of the app gets some commission.]	No answer/not applicable
10b: Risks arising from MyWay for other users	As above	See Q9 – possible rebound effects
11: Would organisation support MyWay usage by users	No	Yes
How?	In general DriveNow does not support aggregator apps at the moment. The reason is to handle every DriveNow customer in our own smartphone app to provide the customer with a full DriveNow customer experience. This attitude could be considered in the future but for now it is general strategy.	Yes, in terms of providing tests with some test users for testing purposes. In general DLR is a research organisation and is involved in similar projects with their own goals.
12: How should MyWay be promoted?	By involving public transport operators; the willingness of the user to shift from applications of the PT operators or operators to aggregator applications is the highest; the promotions should be realised through online campaigns; 'paper' campaigns (newspapers, printed newsletters, flyers) should be avoided.	Through service operators, particularly flinc
13: other comments	No answer/not applicable.	Nice collaboration between the Streetlife Project and MyWay in general at project level, but especially at Berlin Living Lab level (N.B. DLR is a Streetlife Project Partner).

CATALONIA – four repeat interviews, VBC question reported in D1.5

Question	CETRAMSA (Metropolitan Area of Barcelona)	DIBA	Avancar	Sagalés
1: How do you evaluate MyWay technically?	MyWay app seems similar to other Apps in the market, like for example the ones of AMB, TMB or google. It is easy to use and useful. I have tested solutions more related to public transport because that's my job. The MyWay results are similar to other apps and provide good public transport solutions in general, for Barcelona and the metropolitan area. The most important new thing of MyWay is the combination of different transport modes, because people want to know to move. The users' preferences is also interesting but I am not sure if citizens will use it in the end.	It seems to me that it is well designed, it is very usable and quite fast to be used which are basic things for this kind of apps. I think what is remarkable is that it is easy to find addresses and that you can introduce a destination simply pointing it on the map. I remember that it was quite slow searching route options – I don't know if this has been improved. It could still be improved in terms of user-friendliness (e.g. it is not obvious how to get the stages of the trip by moving the bottom bar. An arrow or some indication could help).	My evaluation is very positive. It's a very good app. We have seen plenty of different apps for mobility services and it seems that MyWay is user friendly and it has a good range of mobility solutions for calculating your route, so it includes not only the public transport but also the bike sharing scheme, and even the taxi and the private car, so it's really approaching the topic with a really very open mind.	The application is right, it runs quickly and it's really intuitive, from a technical point of view. In terms of usability the speed is correct and right.
2: Do you think users are likely to use MyWay?	Maybe	Yes	Yes	Yes

Question	CETRAMSA (Metropolitan Area of Barcelona)	DIBA	Avancar	Sagalés
Why?	I am not sure because it is very difficult to introduce a new App into the market to compete with other similar apps which are very established. When someone is used to an app which works properly, it is difficult to get them to change. It might be difficult to attract new users. The combination of different modes of transport might be the key issue to get into the market. Although MyWay might offer new functionalities, according to my experience, the personalisation of your profile is nice at the beginning but you might get bored. People want to know how to get from A to B the fastest way. Data is useful for administrators and companies, but not so much for citizens, who are not very keen to give personal data.	I think that this kind of app is in demand, because everyone needs to move around. The problem is that there are many competitors. Perhaps the difference here is that MyWay can have easier access to information from the public administration. Users are likely to use MyWay because it provides integrated information about different means of transport. It will be useful if public administrations provide their data and the app provides information in real-time.	Yes, but there is a lot of competition here. Having a very good product is not enough for making sure users will use it. It is needed a strong marketing plan behind on top of an excellent product. I don't know if the product is excellent yet, but I think it's very good, so I would wonder which are the business and marketing plans behind to really make it relevant for users. I think users could be interested in using MyWay because mobility in the city is a clear demand, so there is a need for that, and more and more users are trying to find intermodal solutions. There is less car ownership (we can see that in the high growth of Avancar, our car sharing company) and more and more intermodal solutions to optimise time. Summarising: there is a clear need for that and a clear trend of less car ownership in cities.	Yes, I think so, because all the part of public transport is very good, it includes all of different operators and provides all travel options, combining different modes of public transport. This is a distinct advantage in terms of public transport. My Way is good for public transport.
3 Do you think MyWay will benefit users?	Yes	Yes	Yes	Yes

Question	CETRAMSA (Metropolitan Area of Barcelona)	DIBA	Avancar	Sagalés
Why?	In the case of Barcelona city, and the nearest metropolitan area, the public transport system is very good and the current apps provide very good information. In the case of the region of Barcelona and Catalonia, the possibility of combining different modes that MyWay provides will benefit users a lot.	Yes if MyWay can offer something else than other mobility planners (because many users know well the existing planners and it's not easy to move to another app if there is nothing new and more useful). Users will find a planner that offers routes taking into account intermodality and this is a benefit. Another benefit is that it can find a destination without needing to know the exact address. It seems that the speed in calculating routes has been improved. If the speed is higher than others it will be also a benefit for users.	If MyWay is able to convince users to use it, it can benefit them; however, there is a major risk of this app not being known by the users because there is a massive competition in the field of mobility apps. See answer to Q2. Taking into account the benefits for society where there is less people owning or using the private car, there is a growing need for planning users' mobility combining different means of transport.	Yes, it benefits them, because when you put an origin and a destination, it offers all the possible travel options and this is an advantage and a benefit and, also, you can choose. You have a number of preferences and you can value, not only travel time as you do when you're using other journey planners, but in MyWay you have the part of consumption, it's more sustainable.

Question	CETRAMSA (Metropolitan Area of Barcelona)	DIBA	Avancar	Sagalés
5: Strengths/weaknesses compared to other planners	Strengths: Combination of modes of transport; Very easy to use; useful; correct time response; results of PT solutions in the city and metropolitan area are quite good. Trip follower could be useful, but I don't know how people will use it. The same app for different cities, like Moovit or Google.	Strengths: It can find a destination with no need to know the exact address (vs the trip planner MOU-TE); it provides extra information such as calories and CO2 emissions (vs MOU-TE or Google Maps)	Strengths: MyWay gives you a lot of mobility solutions, and it's possible to apply a lot of filters/preferences. You can get statistics on your current usage.	I'm fully familiar with Google. The very big strength is the public transport. In MyWay, there are all the operators and all the transport modes, and this is a differentiating characteristic regarding Google, which depends on the goodness of each operator and also depends on be updated. Transport public in MyWay is very powerful and very strong.

Question	CETRAMSA (Metropolitan Area of Barcelona)	DIBA	Avancar	Sagalés
© MyWay Consortium	Weaknesses: the real time information and disruptions. It is currently the key issue of all the apps (how people can manage their time); detailed information about lines; mobile devices have limitations on how much data can be downloaded and how much memory is used. The flow of data (young people give a lot of importance to this issue).	Weaknesses: Usability could still be improved; it would be good to put all trip options on the same map (like Google Maps).	Weaknesses: Its usability could be improved. The arrow to ask for the route is not emphasized enough. Some users don't know where to click to obtain the route options. It is not obvious how to get the stages of the trip by moving the bottom bar. What does '0m' mean? (next to calories). In our preferences, is it possible to select two items in the optimisation options? E.g. economic and ecologic? It seems you only can click one item. The statistics function could be more visible.	The weakness in MyWay is that there is not real time, which is very important in public transport and in all the different transport modes. Moreover, there are not traffic conditions which I think it's a very important part in order to take decisions when you're planning a trip. What I dislike is how MyWay works when is planning the trip by your own car, and if you compare you can see that in this sense (using private car) MyWay is still light years away from Google. When you're planning a trip with Google, it shows the different routes and inform you about how the traffic conditions are, what are the different options in real time and you can see traffic highlighted in different colours: orange, red... and also Google offers alternative routes. In terms of planning car, MyWay isn't good enough, but the fact of MyWay offers car options is important that there is, because, before your choice, you have to choose whether you prefer to use one transport mode or the other one (for example: by car or by public transport). If you choose the car mode, you will use Google. MyWay is a journey planner.
D6.2 Evaluation of the MyWay Integrated System				84 ECGA No. 609023

Question	CETRAMSA (Metropolitan Area of Barcelona)	DIBA	Avancar	Sagalés
6: Strategic benefit for organisation	One of the strategies of my organisation is 'open data' to be reliable and be used by citizens; MyWay could use our open data and it could help us to find mistakes and get more feedback about our data.	As driver of sustainable mobility, DIBA will support projects in this field. It would be interesting to see if MyWay can be somehow linked with the urban mobility plans which are made at DIBA.	We could potentially add our data into this app. By using open data we could create an API where we could share our car sharing locations and availability with the app.	The benefit is that MyWay promotes public transport regarding the issue of environment, pollution, the consciousness of all of us, and all that makes us increase the number of bus passengers in our company, it is a great tool for a transport operator. Moreover, the fact that MyWay combines different transport modes, different operators, different companies open doors! You can say: I cannot get there using this bus company but I can see some different options to get there because MyWay brings everything around me, I think that there is nothing better, except the router of Gencat: Moute.

Question	CETRAMSA (Metropolitan Area of Barcelona)	DIBA	Avancar	Sagalés
7a: Regional strategic benefit in transport policy and provision.	Real competition of apps – the new apps must include functionalities better than the others (more information, faster, etc; better tools for living in the region.	Users from Barcelona could have more information to move, which is essential in a big city. MyWay could be the public transport showcase. It can unveil new transport services. There is a benefit linked to tourism. Whether tourists use MyWay and see that there is a good public transport network, it can encourage them not to rent a car, for example or even to come visiting Barcelona or Catalonia.	It could help people using more ecological mobility solutions, and it could help local authorities to get more data on the actual trips people are using. If we could have an option where the tracking is always activated, you could have a group of people reporting all their movements so the city officials could see for which kind of trips people are using the car, for example, in order to provide more public transport or improving it there. I think it's a good way to monitor how people are moving around the city and how we can improve mobility.	My Way promotes public transport, and in the municipality is a way to use more the public transport, and we can see the lacks of transport that exist in some destinations and, also, MyWay planify the trip time and with is information you can visit your mayor in the municipality and you can tell him: to go to Barcelona, it takes 2 hours (for example), what can we do about it?

Question	CETRAMSA (Metropolitan Area of Barcelona)	DIBA	Avancar	Sagalés
7b: Regional strategic benefit in attracting investors?	Investors participate if there is the possibility of selling data: what people do, what transport people use more, the most bus station used, etc. Otherwise investors are not interested to create an app. In short, create an app about people and sell the information – for example, how many people go to A and at what time (information about the data); advertisement – users don't like advertisements within the apps.	If you see that there are many tourists who use the application, it would be an advantage to attract investors to incorporate information on tourism (tourist facilities: restaurants, museums, theatres, etc) as long as it is not jeopardising the main function of MyWay, which is getting routes quickly. Companies could pay to be in MyWay and they can receive money for each click in their location/advertisement.	Creating a good product doesn't mean attracting the right investors. There are many other things. In my understanding of start-ups and mobile apps, it is much more important how fast you are able to get a download than if you are actually getting the right product. Many apps are very simple and are successful and many others are very complex and sophisticated and are not successful. So, I don't know how attractive MyWay is for investors at all. It looks interesting, but I don't know how attractive it is for investors, it depends on how many other apps are doing similar things, etc., Maybe it is not about the app, and it is more about the marketing around.	I don't understand your question.

Question	CETRAMSA (Metropolitan Area of Barcelona)	DIBA	Avancar	Sagalés
7c: Regional strategic benefit in building a positive local image?	Technology is very important nowadays to give a good image of the city.	It gives you a good image if MyWay provide many alternatives, because it shows that there is a good supply of transport. It is very important the first impression given to those coming from outside, and this kind of apps are often this first contact.	If the app is very successful and relevant it builds a positive local image. It can help if it is very successful. If the app is not relevant in the market I don't think it will bring any positive image.	It covers and offers the public transport, you are more aware of pollution, consumption and about all the sustainability issues.
8: Other opportunities from market introduction?	Get a lot of information about the people using your app.	MyWay could be a service offered by the websites of facilities, companies, etc., it could be like a plug for 'how to reach'.	It could be a relevant app for mobility. I think that the most powerful part of the app is the emissions and calories tracking. That opens an interesting opportunity for developing other things. Because the rest is a commodity, the rest is not new.	Let me think about opportunities: regarding the transport public MyWay is fantastic, it shows it to everyone. If you can analyse the data using MyWay, you can see which are the routes where is not providing services to users and there are many needs; as a result, new opportunities can be created such as new lines of public transport to fill those holes that there are currently in the territory.

Question	CETRAMSA (Metropolitan Area of Barcelona)	DIBA	Avancar	Sagalés
9: Threats from market introduction?	Competition with the other current apps. During the last 3-4 years there has been a boom of these kinds of apps. You have to offer a very good instrument and promote it through social networks.	High competition. Not enough being announced and people don't know about it. It should ensure that all options are easily visible to the user (for example, the issue of the stages or the journey by moving the bar above), because if the first user experience is not absolutely positive, the user will no longer use the application.	Not being relevant. Not being distinctive enough or well marketed enough to be relevant.	I see not threats. MyWay promotes public transport and the sustainability. A threat is what can jeopardize someone. THREATS: if MyWay doesn't have the correct data, if MyWay doesn't have schedules as necessary, he would be threats by misinformation. I mean, when you're testing an App, and you do three of these searches, if MyWay fails, you don't give opportunities to this App.
10a: Risks arising from MyWay for organisation	No	No.	No	Legal or organizational, I have no idea. Technical risks: MyWay must have the correct data.
10b: Risks arising from MyWay for other users	You have to explain well how you will use the data; Not all citizens have the latest mobile devices and they couldn't use the app; data download and memory limitations of the mobile phone used.	There is a risk of a bad use made with the information collected about the population ways of moving. There is much social awareness about data confidentiality, etc., there is a risk perhaps for other administrations or organisations that promote Apps. I think the role of the government is to provide the data and that it should be the private sector who is developing the app.	For the start-ups that are developing similar technologies and are not subsidized. But maybe they are much faster and find out better solutions so it is not a major risk. Being subsidized is not a guarantee if being successful.	No Answer/not applicable

Question	CETRAMSA (Metropolitan Area of Barcelona)	DIBA	Avancar	Sagalés
11: Would organisation support MyWay usage by users	Yes	Yes	Yes	Yes
How?	At technical level, providing data	MyWay could be recommended by the Urban Mobility Plans which are made at DIBA, as the recommended app. We can support it by giving a positive message on the app through our communication channels and dissemination activities. In the future, we can provide information from the Urban Mobility Plans.	We could promote MyWay within our member base, and we can offer our data into this app as well.	think so, as long as MyWay works well, not deceive the users and It offers as first choice in public transport: Sagalés. I think that is positive, of course.

Question	CETRAMSA (Metropolitan Area of Barcelona)	DIBA	Avancar	Sagalés
12: How should MyWay be promoted?	It should be promoted through social media, but taking into account the age and kind of people. For example, young people use more facebook and games. People from 20-40 years use more twitter and Instagram etc	The calculation of CO2 emissions could be promoted as organisations and companies, which could have a calculation of their CO2 emissions associated with their journeys and allow it to set reduction targets and also bonuses or rewards. Another way to promote it should be to ensure that organisations and companies that have many visitors and generate a lot of mobility will use this application as the application of reference and promote MyWay in their website or mobile app. There would be the possibility of 'gamifying' the information of calories, walking distances, cycling, etc., so that users could compare them.	I think that it should be more promoted as an emissions and calories tracker than as a mobility solution, because as a mobility planner it is not very much distinctive/new/relevant (perhaps the integration of multimodality routes is distinctive and it is what should be promoted)	To promote MyWay is a task of marketing experts. 1) It's essential that data be completely correct, as we have said before, if data is not good, the App, in this case, would be useless. 2) In MyWay, real-time is missing. If we have real time so you can start to advertise MyWay.

Question	CETRAMSA (Metropolitan Area of Barcelona)	DIBA	Avancar	Sagalés
13: other comments	It is easy to use and it is interesting what the app is offering.	It will be interesting to incorporate information about the cost of the trip. The option of walking (up to an hour) should be always considered, because sometimes it is the most reliable option and preferred.		In general terms, I like MyWay application, it is intuitive, it is right. The fact of MyWay offers all the transport modes is very positive. From my point of view, it lacks: traffic conditions and real time. MyWay is a journey planner, not a car navigator. I think that to have the option of statistics –which I have not been able to find it- it seems to me great, it means... that there are many freaky people who like to know all the time what they expend, what they are consuming, how many calories and CO2, and we due to that, this people can be all the day using MyWay.

TRIKALA – 3 repeat interviews, VBC question reported in D1.5

Question	Municipality of Trikala	KTEL	Urban Transportation Services
1: How do you evaluate MyWay technically?	Quite impressive!	Quite good, nothing ground-breaking but solid and useful	Easy to use generally, although it could be even simpler so that users with little 'smartphone experience' can use it more easily.
2: Do you think users are likely to use MyWay?	Yes	Yes	Yes
Why?	Yes, because new technologies always find a test bed in Trikala, and this one has the extra advantage of using our own bus data	Yes, because they can easily know when the next bus will come with a few clicks.	No other application has local bus information
3 Do you think MyWay will benefit users?	Yes	Yes	Yes
Why?	Yes, lots of people living in areas not very close to the centre use the buses and this would be very beneficial to them.	Yes because of the local bus info.	It will help them organize their time and therefore their schedule.
5: Strengths/weaknesses compared to other planners	Strength: strength is the usage of local bus data	Strength: the other planners (e.g. google maps) have become a standard so everything is compared to it, but it doesn't have local bus info like MyWay does.	Strengths: Mainly the info on local buses, and also the CO2 emissions and calories burnt.
	Weakness: a small weakness is how many clicks a user does to plan a trip. Other planners have less.	-	
6: Strategic benefit for organisation	The Municipality of Trikala benefits by embracing new technologies that help it evolve and look to the future in these times of crisis.	-	We could have more statistical data on bus usage.
7a: Regional strategic	That the region supports new tech-	Ease of use for knowing the time of buses	Maybe the usage of less cars and more

Question	Municipality of Trikala	KTEL	Urban Transportation Services
benefit in transport policy and provision.	nologies and is open to even more. Small cities can also participate in innovation.		buses
7b: Regional strategic benefit in attracting investors?	Same as above. Trikala is constantly becoming more known to IT circles.	Investors see that ICT applications exist in Trikala and may want to have more.	Trikala is using new technologies always first and is willing to try new things.
7c: Regional strategic benefit in building a positive local image?	People want their municipality to be daring and innovative and embracing new ideas and technologies.	It could also draw in more tourists, knowing that they can use a planner with local data of the area. So the city's image is even better abroad.	Same as above.
8: Other opportunities from market introduction?	We become a model city, attract people to live here and offer opportunities.	Maybe new job opportunities, if the app grows and evolves?	-
9: Threats from market introduction?	None	Nothing	Nothing really.
10a: Risks arising from MyWay for organisation	No	No	No.
10b: Risks arising from MyWay for other users	No	No	-
11: Would organisation support MyWay usage by users	Yes	Yes	Yes
How?	Though the municipality's web site and by mentioning it in local news.	Have flyers in the buses.	Advertising it in the buses or on the tickets
12: How should MyWay be promoted?	Advertisement in websites and social media.	Posters, advertisement, internet, social media.	Advertising and speaking of it, and on local websites.
13: other comments	None		-

ANNEX 2: RESULTS OF COMPARATIVE SEARCHES WITH VARIOUS TRIP PLANNERS

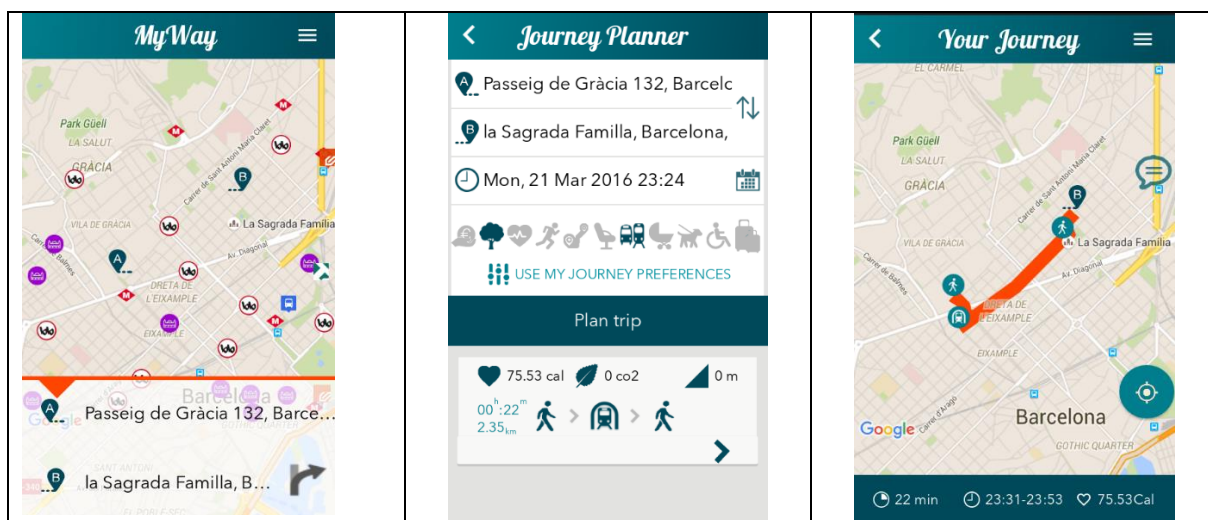
For each case, the search details are given, the user's opinion on the optimum solution and then the results by each of MyWay, Mou-Te, TMB app and Google maps, accompanied by the screen-shots showing the trip planners proposed itineraries.

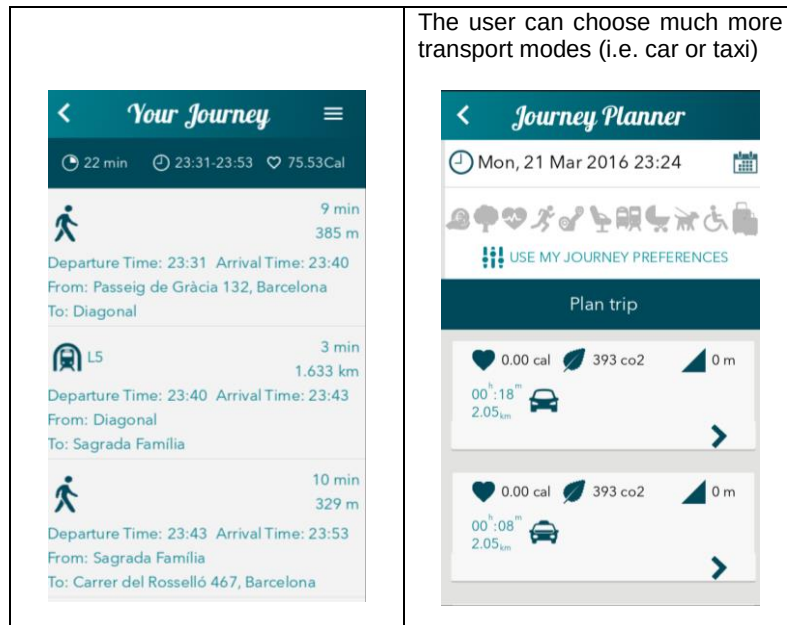
CASE 1: URBAN ROUTE

Search from address to point of interest: **From Passeig de Gràcia 132, Barcelona to Sagrada Família.**

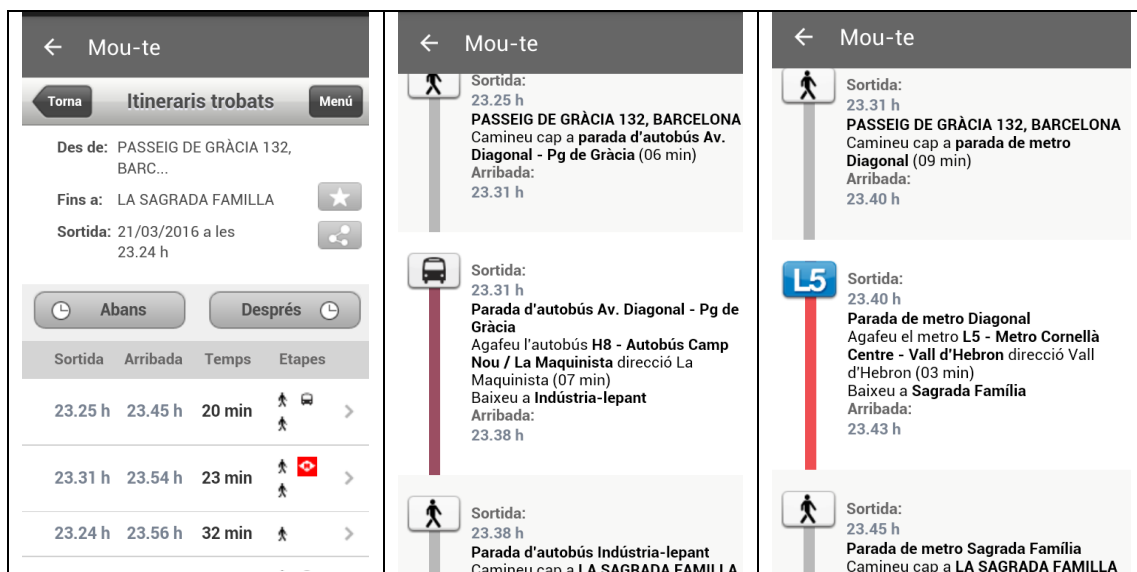
From the point of view of the user, the best option in public transport is taking the Metro (L5) because the frequency of the metro in Barcelona is very high.

Using MyWay: MyWay proposes the right options and, additional mobility solutions getting a taxi or a private car.

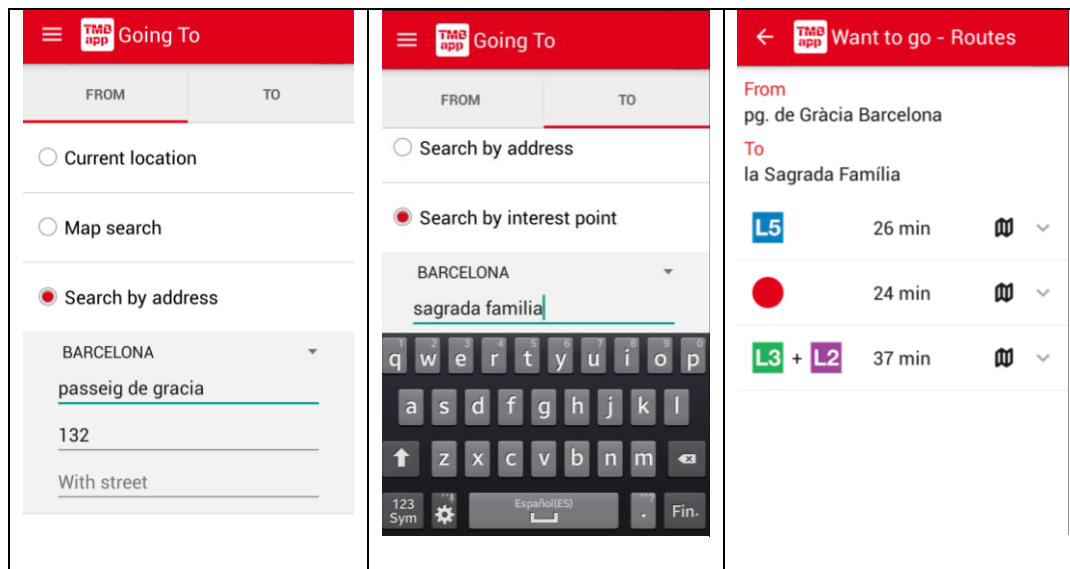




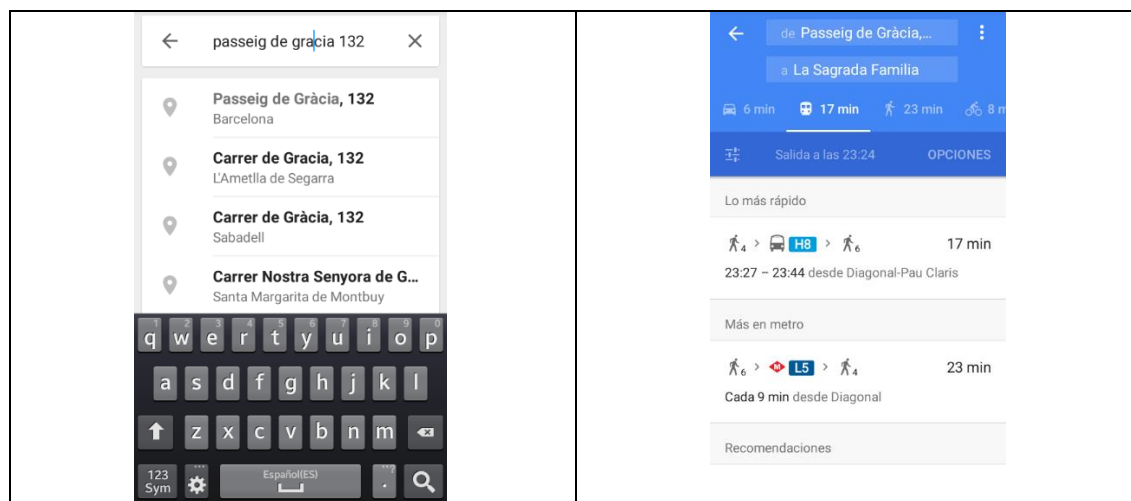
- Using **Mou-te** (smartphone version): The first two best options proposed are using public transport, or taking the bus (H8 line) or taking the Metro (L5 line, blue)



- Using **TMB app**: The two first best options proposed include the Metro (L5 line) or walking.



- Using **Google**: Again, the two first best options proposed are including the bus (H8 line) or the Metro (L5 line).

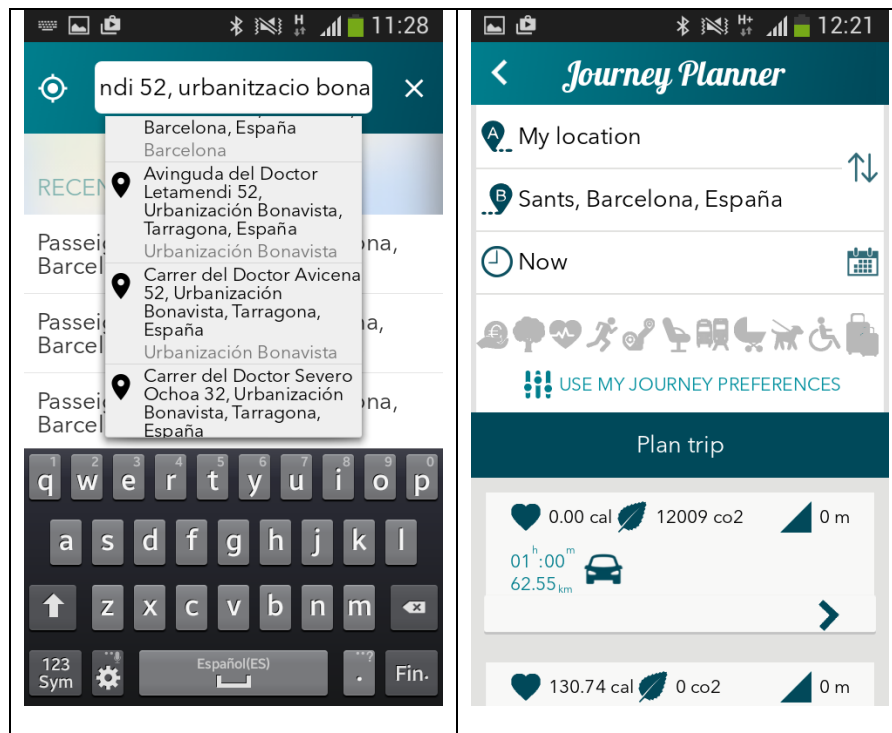


CASE 2: INTERURBAN ROUTE (COMMUTER JOURNEY)

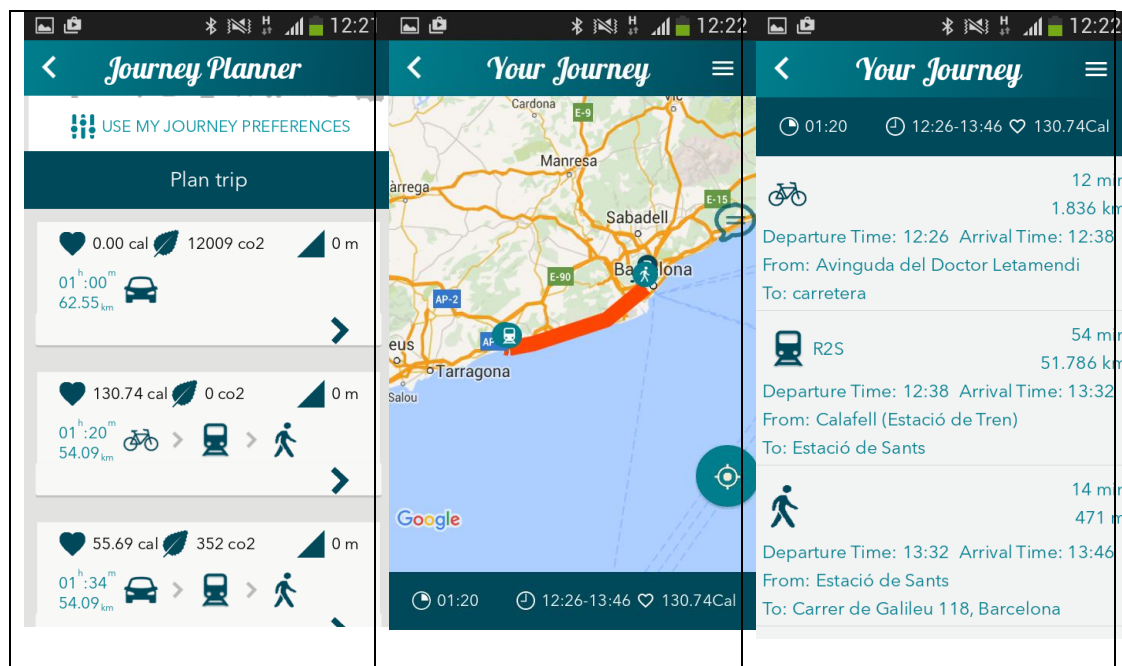
Search from an address in the municipality of Vendrell to a public transport stop in Barcelona city:
From address Doctor Letamendi 52, El Vendrell (Urbanització Bonavista) to area of Sants Station (Barcelona).

From the point of view of the user, the best option is walking (or by urban bus or private car) to get to the train station in the Municipality of Calafell (very close to the municipality of El Vendrell) and then arrive to Sants Station area.

- Using **MyWay**: The point of origin could be selected using the autocomplete functionality or the geolocator by clicking “My location”.



MyWay presented three different trip plans, by car or combining several transport modes. The second option proposed is the more recommended, using public transport combined with bike at the beginning of the trip, and taking the train to Sants Station and, if necessary, walking to reach the exact destination in Sants area.

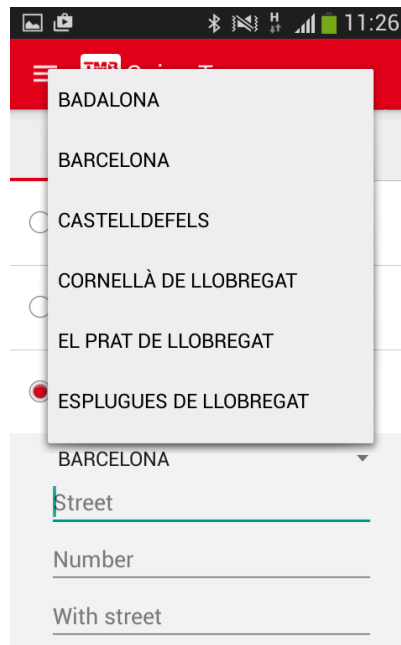


- Using Mou-te: Mou-te presented several ways to make this journey, but the first one is the most recommended one (walking + train R2 Rodalies).

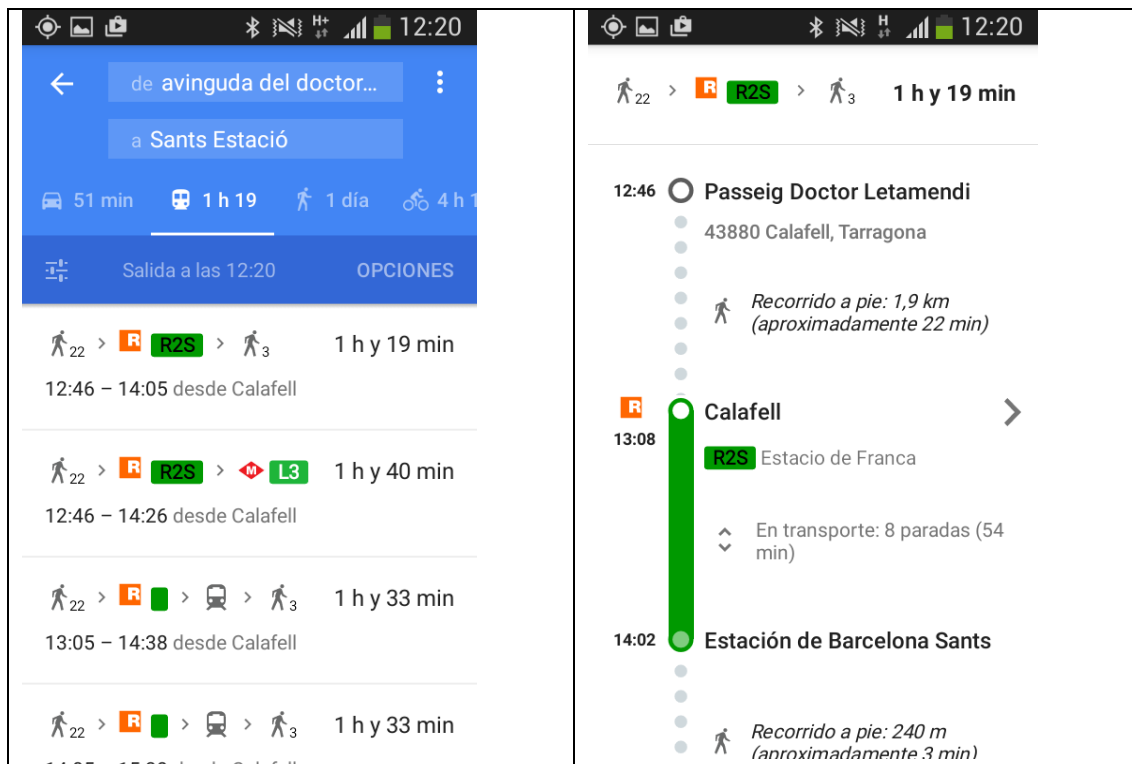




- Using TMB app: This App cannot find an origin or destination point too far away from the metropolitan area of Barcelona, as in this case are the municipalities of Calafell or El Vendrell which belong to the areas of Tarragona.



- Using Google: Google presented several ways to make this journey, but the first one is the most recommended one (walking to get the Calafell Station+ train R2 Rodalies to get Sants Station). The second one combines walking to reach the Calafell train station + train R2 Rodalies + Metro (line 3 green) but in this case, note that the user should not take the Metro as Google suggests. If the user chooses the second option, the trip will last much longer than necessary.



CASE 3: URBAN ROUTE

Search from an address to another address within Barcelona city: **From Josep Tarradellas Avenue 2, Barcelona to Olot Street, Barcelona.**

From the point of view of the user, the best option in public transport is taking an urban bus of line 32 operated by TMB (Metropolitan Transports of Barcelona).

- Using [MyWay](#): MyWay suggests this right option ranked in the first position of the results.



- Using Mou-te:

Mou-te presents several options using public transport to make this trip, but the first one is the same as in MyWay.

Guardando captura de pantalla...

← Mou-te

Des de: AVINGUDA DE JOSEP TARRADELL...

Fins a: CARRER D'OLOT, BARCELONA ★

Sortida: 18/03/2016 a les 09.00 h

Abans Després

Sortida	Arribada	Temps	Etapas
08.56 h	09.34 h	38 min	 
08.58 h	09.40 h	42 min	 
09.01 h	09.40 h	39 min	 
09.18 h	10.00 h	42 min	 

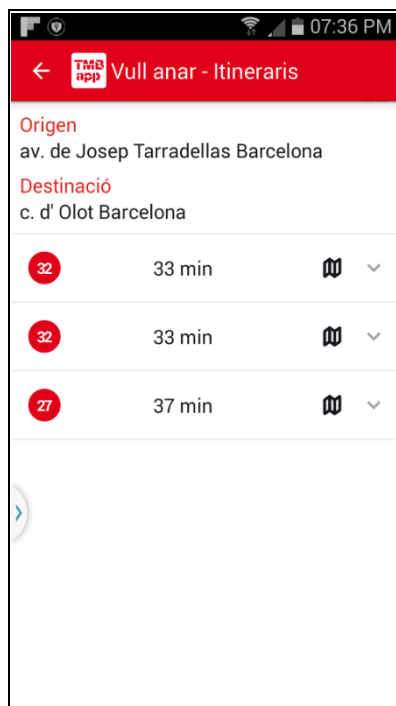
← Mou-te

Sortida: 08.56 h
AVINGUDA DE JOSEP TARRADELLAS 2, BARCELONA
 Camineu cap a parada d'autobús Josep Tarradellas-rosselló (04 min)
 Arribada: 09.00 h

Sortida: 09.00 h
Parada d'autobús Josep Tarradellas-rosselló
 Agafeu l'autobús 32 - Autobús Estació de Sants / Roquetes direcció Pl de les Roquetes (23 min)
 Baixeu a Travessera de Dalt-la Granja
 Arribada: 09.23 h

Sortida: 09.23 h
Parada d'autobús Travessera de Dalt-la Granja
 Camineu cap a CARRER D'OLOT, BARCELONA (11 min)
 Arribada: 09.34 h

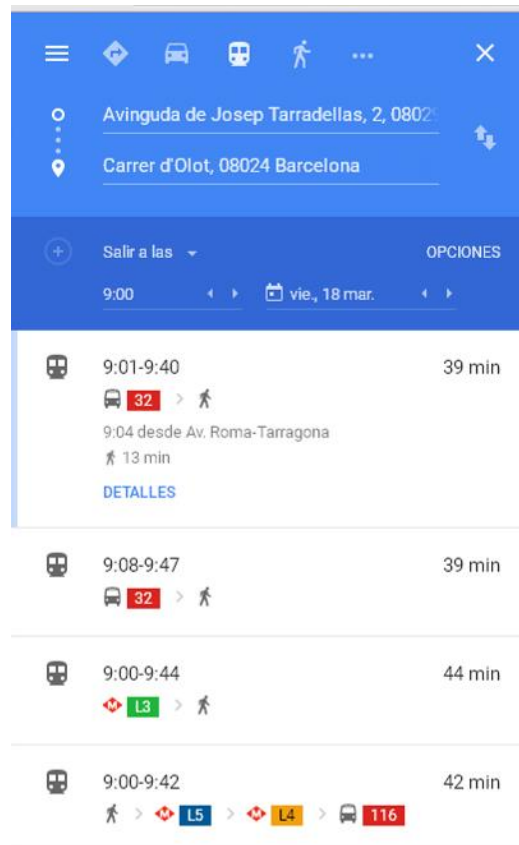
- Using TMB app: This App shows only results using buses. The first option shows the same result as MyWay and Mou-te journey planners, with line 32 of Barcelona urban line which is operated by TMB.



•

- Using Google

In this case, Google shows several results combining different kinds of public transport, but the first and second options suggest the same urban bus as the rest of journey planners (32 bus line by TMB).



CASE 4: URBAN ROUTE

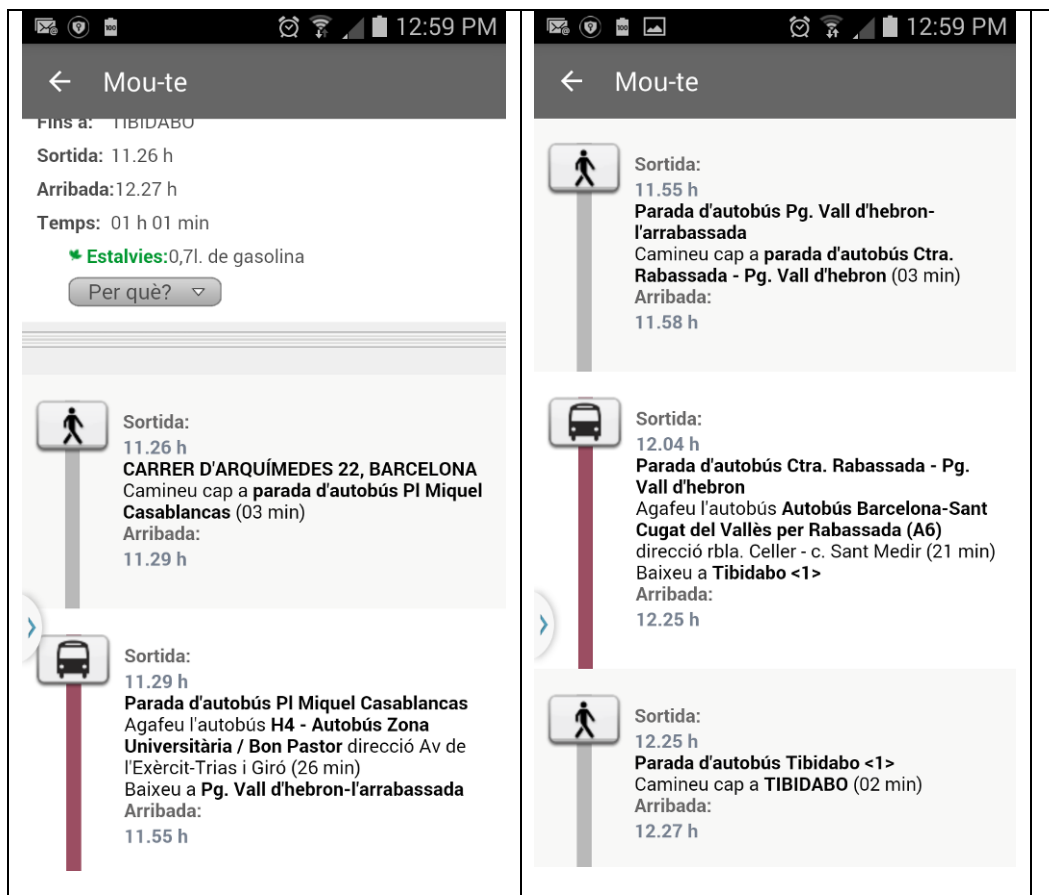
Search from an address to a point of interest within Barcelona: **From address Arquímedes Street in Barcelona to Tibidabo Park (Barcelona).**

From the point of view of the user, the best results are obtained combining a Barcelona urban bus (H4 line operated by TMB) with and interurban bus A6 (also named L0242).

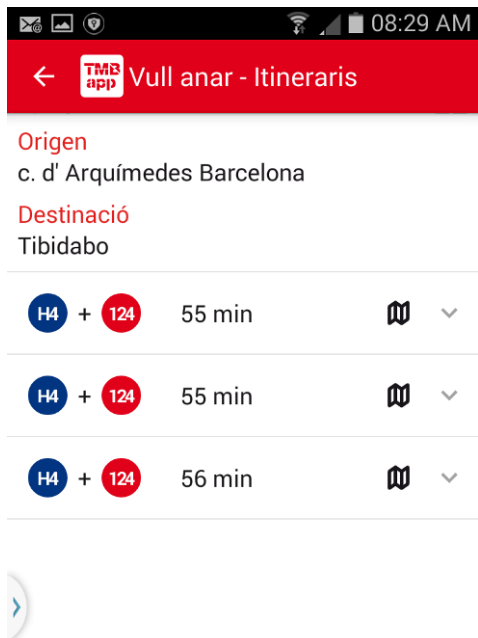
- Using MyWay: MyWay proposes the right result in the first position.

Planificador de viaje	Tu viaje	Tu viaje
A Carrer d'Arquímedes 22, Barcelona B Camí de Vallvidrera al Tibidabo 6, E vie, 18 mar 2016 09:00 USAR MIS PREFERENCIAS DE VIAJE Buscar 27,72 cal 459 co2 0 m 01:00 6.48 km 75,53 cal 98 co2 0 m 01:29 13.8 km	60 min 11:26-12:26 27,72Cal 3 min 95 m Hora de salida: 11:26 Hora de llegada: 11:29 Desde: Carrer d'Arquímedes 22, Barcelona Hasta: Pl Miquel Casablanças H4 26 min 4.597 km Hora de salida: 11:29 Hora de llegada: 11:55 Desde: Pl Miquel Casablanças Hasta: Pg. Vall d'hebron-l'arrabassada 3 min 42 m Hora de salida: 11:55 Hora de llegada: 11:58 Desde: Pg. Vall d'hebron-l'arrabassada Hasta: Ctra. Rabassada - Pg. Vall d'hebron L0242 21 min 1.701 km Hora de salida: 12:04 Hora de llegada: 12:25 Desde: Ctra. Rabassada - Pg. Vall d'hebron Hasta: Tibidabo <1>	60 min 11:26-12:26 27,72Cal 26 min 4.597 km H4 26 min 4.597 km Hora de salida: 11:29 Hora de llegada: 11:55 Desde: Pl Miquel Casablanças Hasta: Pg. Vall d'hebron-l'arrabassada 3 min 42 m Hora de salida: 11:55 Hora de llegada: 11:58 Desde: Pg. Vall d'hebron-l'arrabassada Hasta: Ctra. Rabassada - Pg. Vall d'hebron L0242 21 min 1.701 km Hora de salida: 12:04 Hora de llegada: 12:25 Desde: Ctra. Rabassada - Pg. Vall d'hebron Hasta: Tibidabo <1> 1 min 45 m Hora de salida: 12:25 Hora de llegada: 12:26 Desde: Tibidabo <1> Hasta: Camí de Vallvidrera al Tibidabo 6, Barcelona

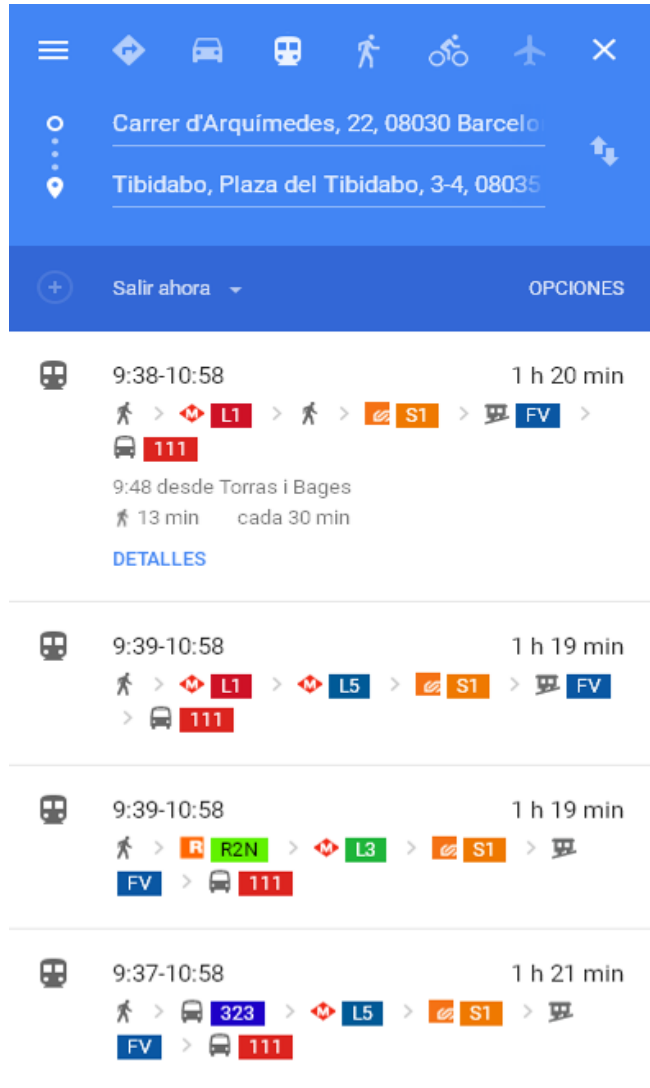
- Using **Mou-te**: A result similar to MyWay and according to the user's preferences is proposed by Mou-te.



- Using TMB App: This App combines TMB bus line H4 + TMB bus line 124.
-



- Using Google: Google proposes several options using public transport to make this trip, but it is the local people guess that none of these suggested intermodal itineraries is the best way to make this trip.



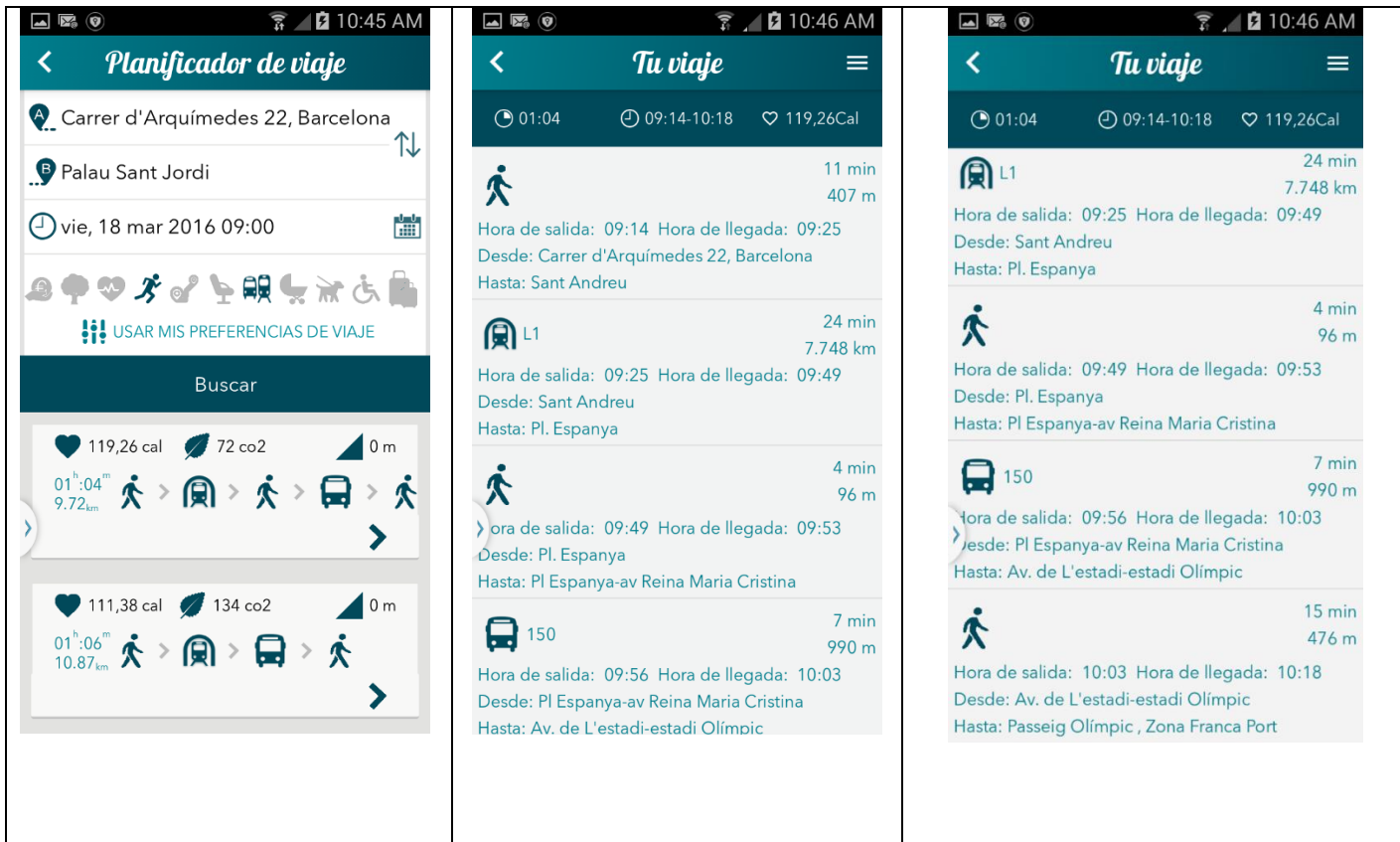
The screenshot shows the Google Maps interface with a search for a route from Carrer d'Arquímedes, 22, 08030 Barcelona to Tibidabo, Plaza del Tibidabo, 3-4, 08035. The interface displays four suggested itineraries, each starting with a train icon and a time range (9:38-10:58, 9:39-10:58, 9:39-10:58, and 9:37-10:58). The total travel time for each itinerary is 1 h 20 min, 1 h 19 min, 1 h 19 min, and 1 h 21 min respectively. The itineraries are represented by a sequence of icons: a person walking, a train, a bus, a tram, a car, and a bicycle. The first itinerary includes a red '111' bus icon. The second itinerary includes a red '111' bus icon. The third itinerary includes a red '111' bus icon. The fourth itinerary includes a red '111' bus icon. The itineraries are separated by horizontal lines. The first itinerary is highlighted with a blue background. The second itinerary is highlighted with a blue background. The third itinerary is highlighted with a blue background. The fourth itinerary is highlighted with a blue background. The itineraries are separated by horizontal lines. The first itinerary is highlighted with a blue background. The second itinerary is highlighted with a blue background. The third itinerary is highlighted with a blue background. The fourth itinerary is highlighted with a blue background.

CASE 5: URBAN ROUTE

Search from an address to a point of interest within Barcelona: **From address Arquímedes Street 22, in Barcelona to Palau Sant Jordi (Barcelona).**

The best combination chosen by the Gencat user is combining metro (L1 Red) and urban bus line 150.

- Using MyWay: The best combination is proposed by MyWay as the first option.



The screenshots show the MyWay app interface for planning a trip from Carrer d'Arquímedes 22, Barcelona to Palau Sant Jordi on Wednesday, March 18, 2016, at 09:00.

Screenshot 1: Planificador de viaje

- Origin: Carrer d'Arquímedes 22, Barcelona
- Destination: Palau Sant Jordi
- Date/Time: vie, 18 mar 2016 09:00
- Options: USAR MIS PREFERENCIAS DE VIAJE
- Search button: Buscar
- Results:
 - Option 1: 119,26 cal, 72 co2, 0 m. Route: 01h:04m, 9.72km. Icons: walking, metro, walking, bus, walking.
 - Option 2: 111,38 cal, 134 co2, 0 m. Route: 01h:06m, 10.87km. Icons: walking, metro, bus, walking.

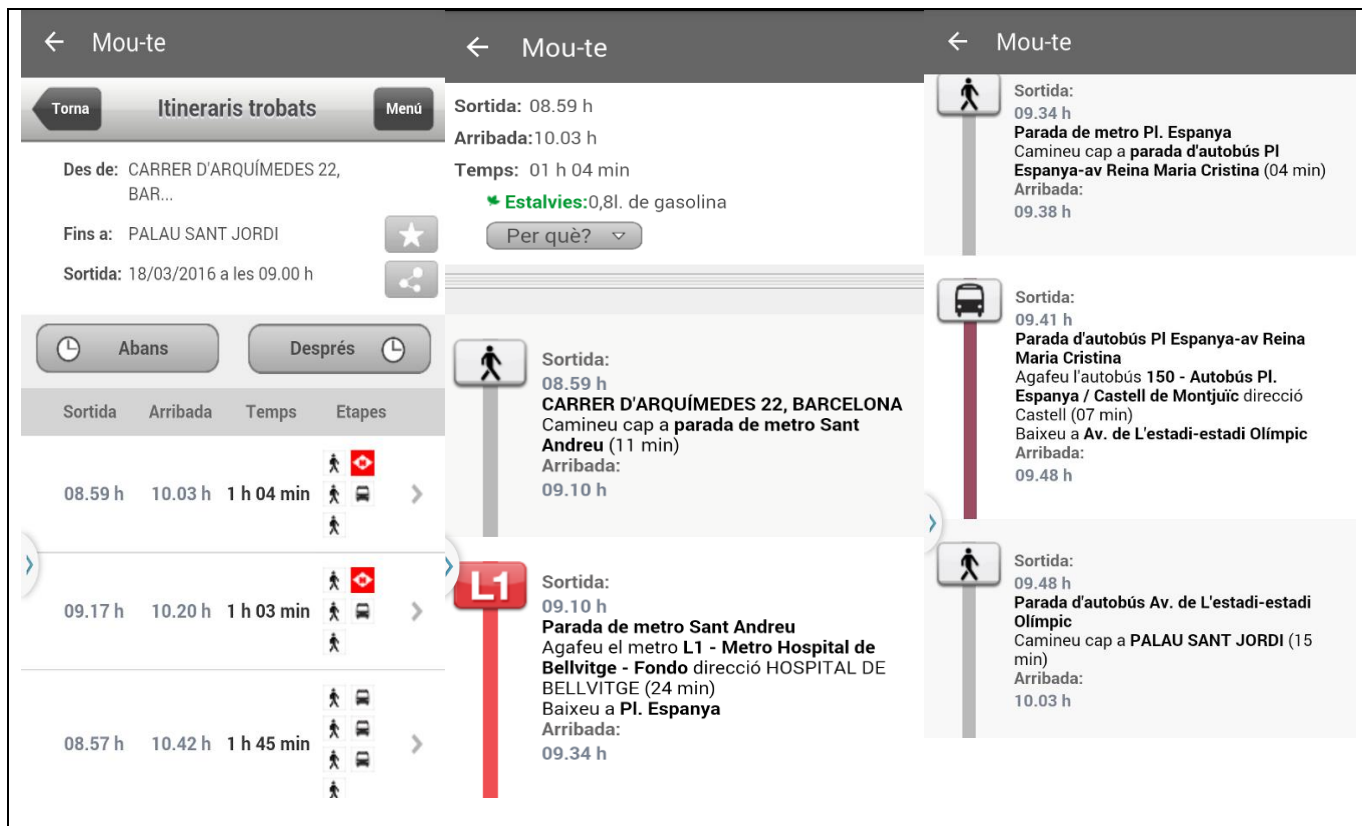
Screenshot 2: Tu viaje

- Summary: 01:04, 09:14-10:18, 119,26Cal
- Leg 1: Walking (11 min, 407 m). Hora de salida: 09:14, Hora de llegada: 09:25. Desde: Carrer d'Arquímedes 22, Barcelona. Hasta: Sant Andreu.
- Leg 2: Metro L1 (24 min, 7.748 km). Hora de salida: 09:25, Hora de llegada: 09:49. Desde: Sant Andreu. Hasta: Pl. Espanya.
- Leg 3: Walking (4 min, 96 m). Hora de salida: 09:49, Hora de llegada: 09:53. Desde: Pl. Espanya. Hasta: Pl Espanya-av Reina Maria Cristina.
- Leg 4: Bus 150 (7 min, 990 m). Hora de salida: 09:56, Hora de llegada: 10:03. Desde: Pl Espanya-av Reina Maria Cristina. Hasta: Av. de L'estadi-estadi Olímpic.
- Leg 5: Walking (15 min, 476 m). Hora de salida: 10:03, Hora de llegada: 10:18. Desde: Av. de L'estadi-estadi Olímpic. Hasta: Passeig Olímpic, Zona Franca Port.

Screenshot 3: Tu viaje

- Summary: 01:04, 09:14-10:18, 119,26Cal
- Leg 1: Metro L1 (24 min, 7.748 km). Hora de salida: 09:25, Hora de llegada: 09:49. Desde: Sant Andreu. Hasta: Pl. Espanya.
- Leg 2: Walking (4 min, 96 m). Hora de salida: 09:49, Hora de llegada: 09:53. Desde: Pl. Espanya. Hasta: Pl Espanya-av Reina Maria Cristina.
- Leg 3: Bus 150 (7 min, 990 m). Hora de salida: 09:56, Hora de llegada: 10:03. Desde: Pl Espanya-av Reina Maria Cristina. Hasta: Av. de L'estadi-estadi Olímpic.
- Leg 4: Walking (15 min, 476 m). Hora de salida: 10:03, Hora de llegada: 10:18. Desde: Av. de L'estadi-estadi Olímpic. Hasta: Passeig Olímpic, Zona Franca Port.

- Using Mou-te: The recommended result is suggested by Mou-te in the first position.



The screenshot displays the Mou-te app interface with a travel itinerary. The main screen shows the route from Carrer d'Arquímedes 22 to Palau Sant Jordi, starting at 08:59 and arriving at 10:03, with a total time of 1 hour and 4 minutes. The itinerary is broken down into three stages:

Sortida	Arribada	Temps	Etales
08.59 h	10.03 h	1 h 04 min	Icones de transport públic
09.17 h	10.20 h	1 h 03 min	Icones de transport públic
08.57 h	10.42 h	1 h 45 min	Icones de transport públic

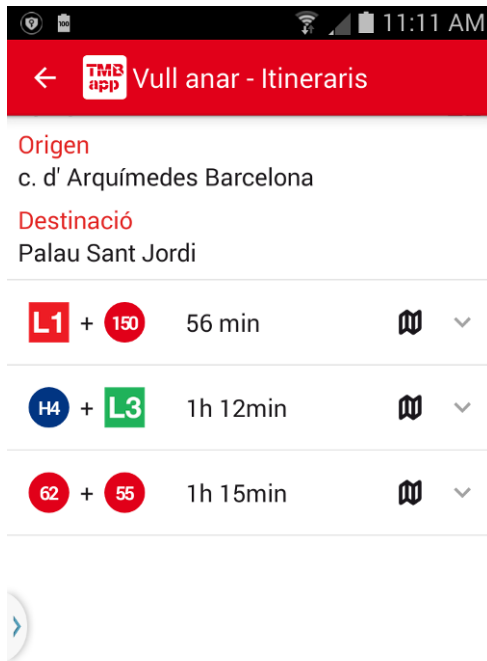
On the right, detailed information for each stage is provided:

- Stage 1:** Sortida: 08.59 h, Arribada: 10.03 h, Temps: 01 h 04 min. Estalvies: 0,8l. de gasolina. Per què? dropdown.
- Stage 2:** Sortida: 08.59 h, Arribada: 09.10 h. Camineu cap a parada de metro Sant Andreu (11 min).
- Stage 3:** Sortida: 09.10 h, Arribada: 09.34 h. Parada de metro Sant Andreu. Agafeu el metro L1 - Metro Hospital de Bellvitge - Fondo direcció HOSPITAL DE BELLVITGE (24 min). Baixeu a Pl. Espanya.

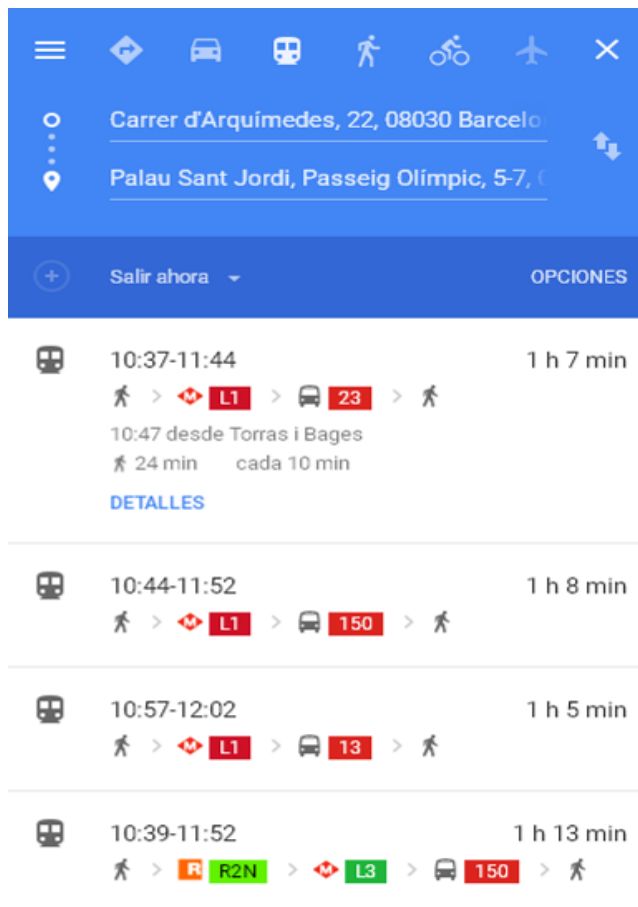
On the far right, additional route details are shown:

- Route 1:** Sortida: 09.34 h, Arribada: 09.38 h. Parada de metro Pl. Espanya. Camineu cap a parada d'autobús Pl Espanya-av Reina Maria Cristina (04 min).
- Route 2:** Sortida: 09.41 h, Arribada: 09.48 h. Parada d'autobús Pl Espanya-av Reina Maria Cristina. Agafeu l'autobús 150 - Autobús Pl. Espanya / Castell de Montjuïc direcció Castell (07 min). Baixeu a Av. de L'estadi-estadi Olímpic.
- Route 3:** Sortida: 09.48 h, Arribada: 10.03 h. Parada d'autobús Av. de L'estadi-estadi Olímpic. Camineu cap a PALAU SANT JORDI (15 min).

- Using TMB App: It shows, in the first place, the same result taking public transport as MyWay and Mou-te. Moreover, it shows a pair more of trips using public transport, but the journey will takes longer in this way.



- Using Google: The recommended result (L1 Red line + urban bus line 150) appears in the second place, and Google shows a new result combining metro (L1 Red line) + urban bus line 23 in the first position.



The screenshot shows the Google Maps interface with the following details:

- Origin:** Carrer d'Arquimedes, 22, 08030 Barcelona
- Destination:** Palau Sant Jordi, Passeig Olímpic, 5-7, Barcelona
- Mode:** Salir ahora (Walking)
- Options:** OPCIONES

The results list four transit options:

Option	Time	Duration	Route
1	10:37-11:44	1 h 7 min	Walking > L1 > Bus 23 > Walking
2	10:44-11:52	1 h 8 min	Walking > L1 > Bus 150 > Walking
3	10:57-12:02	1 h 5 min	Walking > L1 > Bus 13 > Walking
4	10:39-11:52	1 h 13 min	Walking > R2N > L3 > Bus 150 > Walking

Additional details for the first option (10:37-11:44):

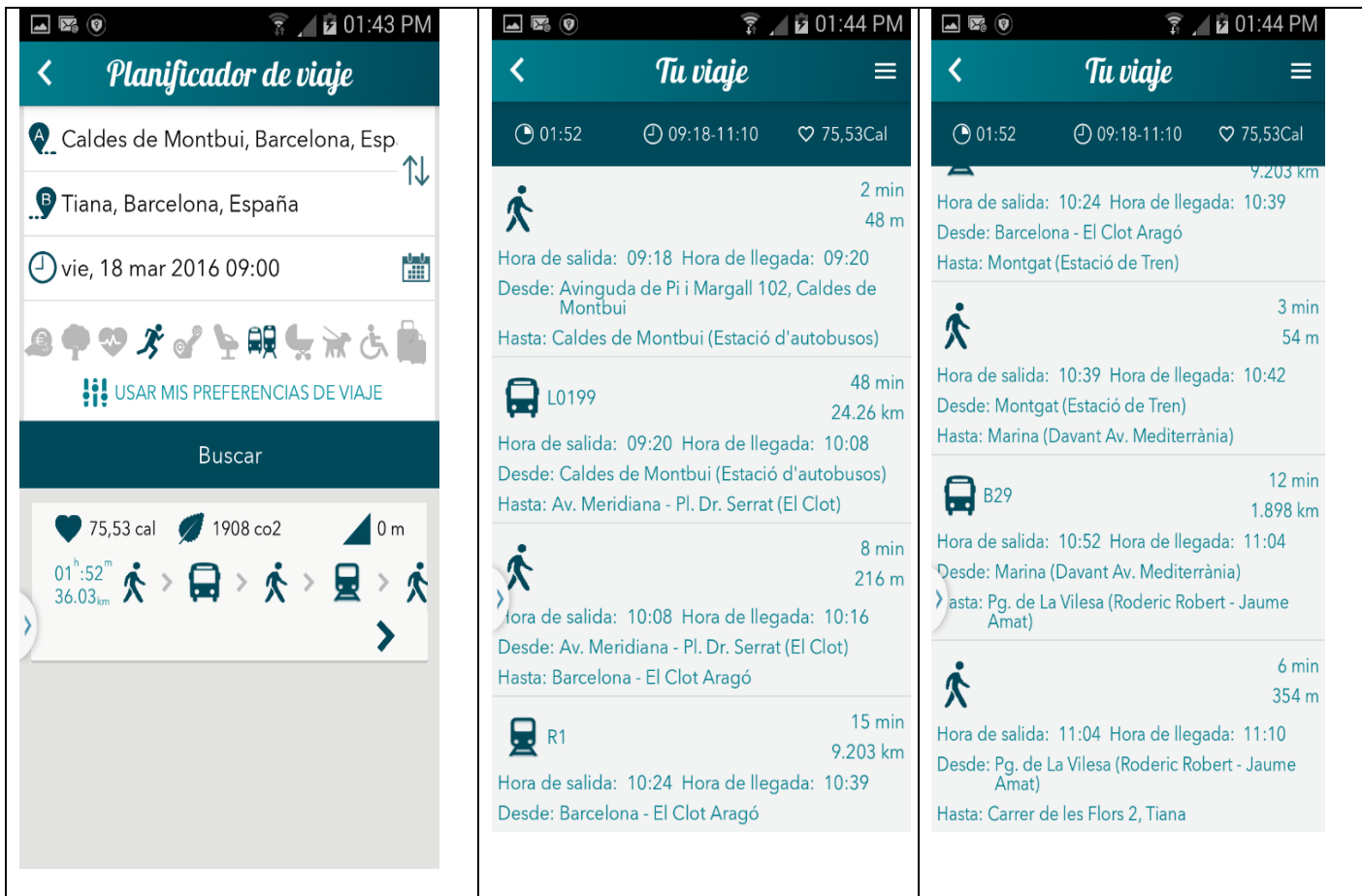
- 10:47 desde Torras i Bages
- 24 min cada 10 min
- [DETALLES](#)

CASE 5: INTERURBAN ROUTE

Search from the municipality of Caldes de Montbui to the municipality of Tiana.

From the point of view of the user, the best results is a combination of express bus line e9 (L0199) + Rodalies R1 line + bus B29.

- Using [MyWay](#): MyWay proposes the right option to make this trip.



The screenshots show the MyWay app interface for planning a trip from Caldes de Montbui, Barcelona, Spain to Tiana, Barcelona, Spain on Wednesday, March 18, 2016, at 09:00.

Screenshot 1: Planificador de viaje

- Origin: Caldes de Montbui, Barcelona, Esp
- Destination: Tiana, Barcelona, España
- Date/Time: vie, 18 mar 2016 09:00
- Icons for various transport modes and preferences.
- Button: USAR MIS PREFERENCIAS DE VIAJE
- Button: Buscar
- Summary: 75,53 cal, 1908 co2, 0 m
- Route preview: 01:52, 36.03 km, showing a sequence of icons (walking, bus, walking, train, walking).

Screenshot 2: Tu viaje

- Summary: 01:52, 09:18-11:10, 75,53 Cal
- Walking: 2 min, 48 m
- Bus L0199: 48 min, 24.26 km
 - Hora de salida: 09:18 Hora de llegada: 09:20
 - Desde: Avinguda de Pi i Margall 102, Caldes de Montbui
 - Hasta: Caldes de Montbui (Estació d'autobusos)
- Walking: 8 min, 216 m
 - Hora de salida: 10:08 Hora de llegada: 10:16
 - Desde: Av. Meridiana - Pl. Dr. Serrat (El Clot)
 - Hasta: Barcelona - El Clot Aragó
- Train R1: 15 min, 9.203 km
 - Hora de salida: 10:24 Hora de llegada: 10:39
 - Desde: Barcelona - El Clot Aragó

Screenshot 3: Tu viaje

- Summary: 01:52, 09:18-11:10, 75,53 Cal
- Walking: 3 min, 54 m
 - Hora de salida: 10:24 Hora de llegada: 10:39
 - Desde: Barcelona - El Clot Aragó
 - Hasta: Montgat (Estació de Tren)
- Bus B29: 12 min, 1.898 km
 - Hora de salida: 10:39 Hora de llegada: 10:42
 - Desde: Montgat (Estació de Tren)
 - Hasta: Marina (Davant Av. Mediterrània)
- Walking: 6 min, 354 m
 - Hora de salida: 10:52 Hora de llegada: 11:04
 - Desde: Marina (Davant Av. Mediterrània)
 - Hasta: Pg. de La Vilesa (Roderic Robert - Jaume Amat)
- Walking: 6 min, 354 m
 - Hora de salida: 11:04 Hora de llegada: 11:10
 - Desde: Pg. de La Vilesa (Roderic Robert - Jaume Amat)
 - Hasta: Carrer de les Flors 2, Tiana

- Using **Mou-te**: Mou-te presents the user's suggested combination in the 1st place.



← Mou-te

Torna Itineraris trobats Menú

Des de: CALDES DE MONTBUI

Fins a: TIANA

Sortida: 18/03/2016 a les 09.00 h

Abans Després

Sortida	Arribada	Temps	Etales
08.50 h	10.40 h	1 h 50 min	 
09.00 h	10.55 h	1 h 55 min	 
08.50 h	11.10 h	2 h 20 min	 



← Mou-te

Generalitat de Catalunya

Torna Itineraris trobats Menú

Des de: CALDES DE MONTBUI

Fins a: TIANA

Sortida: 08.50 h

Arribada: 10.40 h

Temps: 01 h 50 min

Estalvies: 2,7l. de gasolina

Per què?

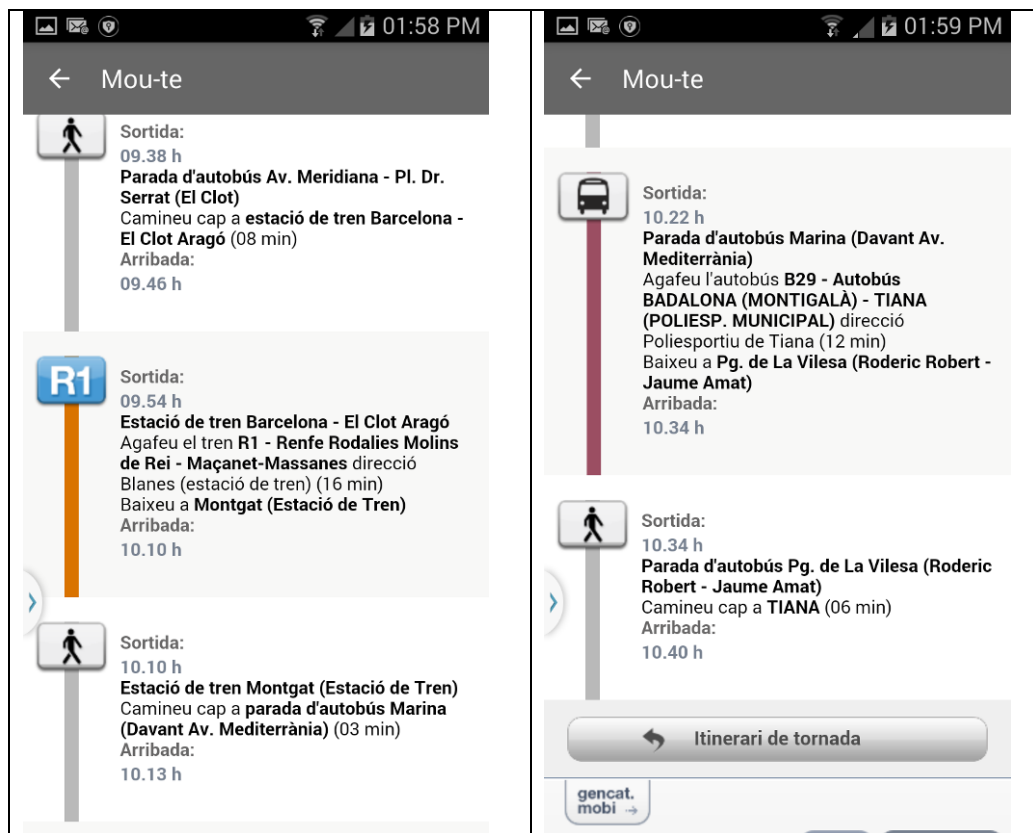
Sortida: 08.50 h

CALDES DE MONTBUI

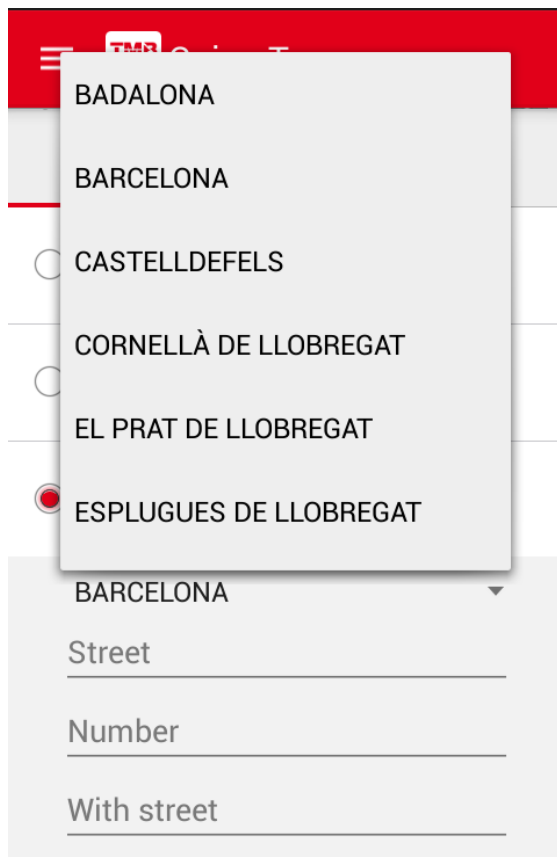
Agafeu l'autobús **Autobús e9 Caldes de Montbui - Palau-solità - Barcelona** direcció pg. Sant Joan - c. Diputació (48 min)

Baixeu a **Av. Meridiana - Pl. Dr. Serrat (El Clot)**

Arribada: 09.38 h

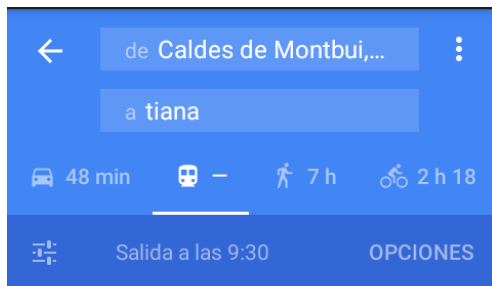


- Using **TMB App**: This application could not find on the autocomplete functionality the municipality of Caldes de Montbui.



The screenshot shows the TMB App interface. A dropdown menu is open, displaying a list of city suggestions: BADALONA, BARCELONA, CASTELLDEFELS, CORNELLÀ DE LLOBREGAT, EL PRAT DE LLOBREGAT, and ESPLUGUES DE LLOBREGAT. Below the dropdown, there are input fields for 'Street', 'Number', and 'With street'.

- Using Google: Google was not able to suggest a trip via public transport from the Municipality of Caldes de Montbui to the Municipality of Tiana.



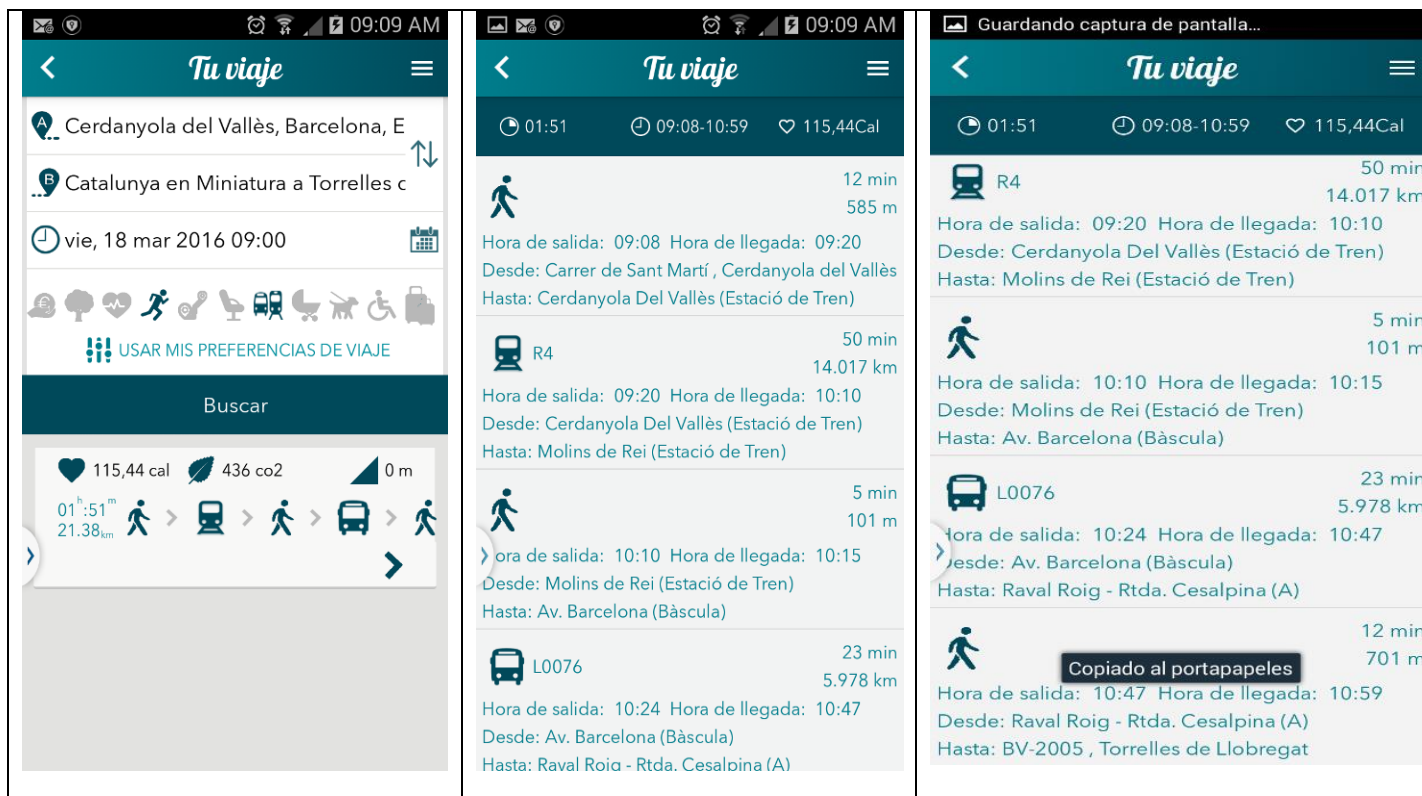
No se ha encontrado ninguna
ruta.

CASE 6: INTERURBAN ROUTE

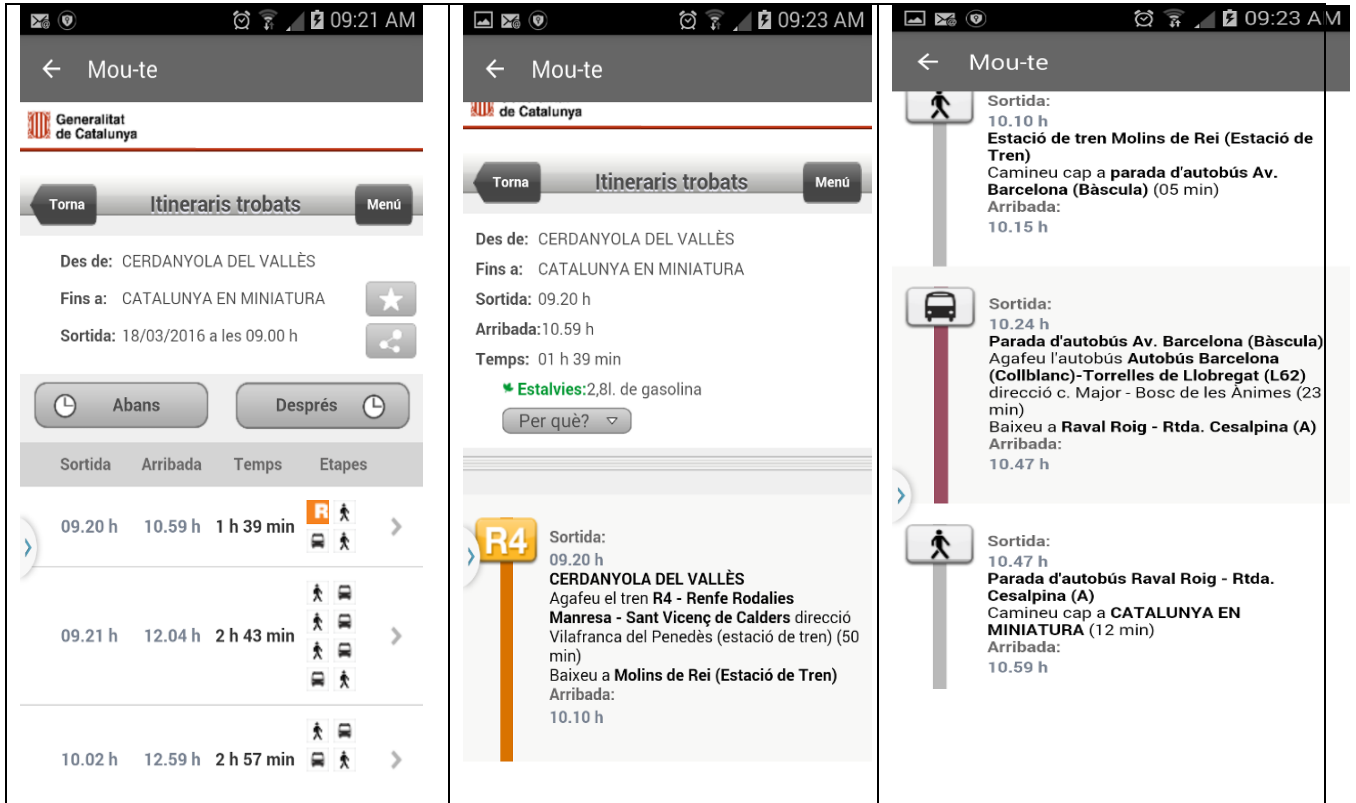
Search from the municipality of Cerdanyola del Vallès to the point of interest named Catalunya en miniatura, located in the municipality of Torrelles de Llobregat.

From the point of view of the user, the best results are obtained combining the train (Rodalies R4 line) and a regular bus L62 (also named L0076).

- Using **MyWay**: It proposes exactly the correct result.



- Using **Mou-te**: The user's recommended itinerary is shown in the first position.



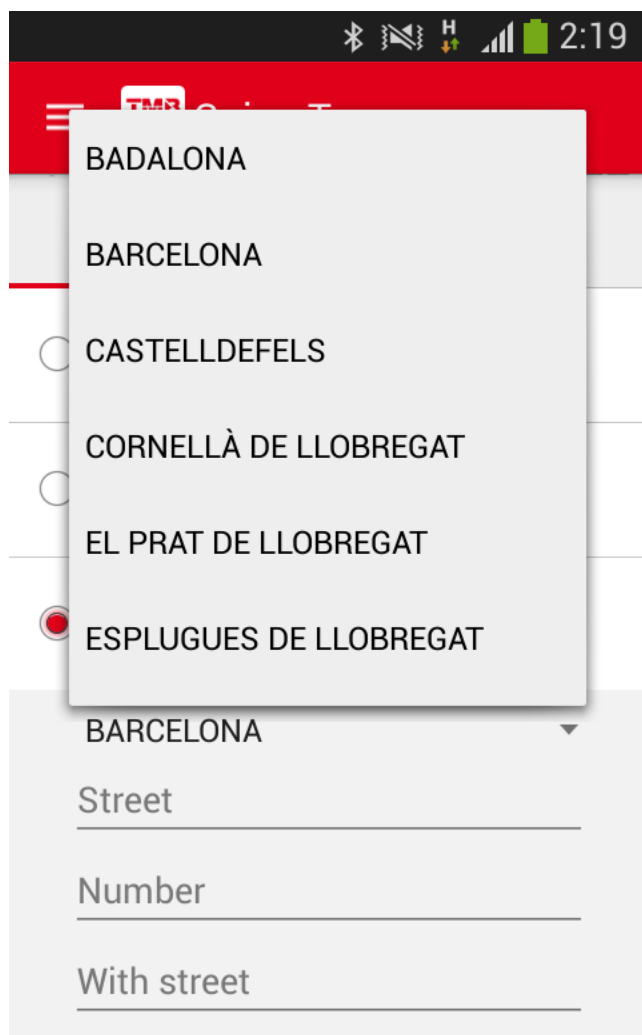
The screenshots show the Mou-te app interface across three stages of a journey planning process. The app is titled 'Mou-te' and is associated with the 'Generalitat de Catalunya'.

Screenshot 1 (09:21 AM): The 'Itineraris trobats' (Found Itineraries) screen displays three options. The first option is highlighted with a red bar and a star icon, indicating it is the recommended itinerary. It shows a departure time of 09:20 h, an arrival time of 10:59 h, and a duration of 1 h 39 min. The second option shows a departure of 09:21 h and an arrival of 12:04 h (2 h 43 min). The third option shows a departure of 10:02 h and an arrival of 12:59 h (2 h 57 min). The app also shows a 'Des de: Cerdanyola del Vallès' and 'Fins a: Catalunya en Miniatura'.

Screenshot 2 (09:23 AM): This screen shows a detailed view of the recommended itinerary (R4). It includes the departure time (09:20 h), arrival time (10:59 h), and duration (01 h 39 min). It also shows the estimated cost: 'Estalvis: 2,8l. de gasolina' (Savings: 2.8l. of gasoline). The itinerary details are: 'Sortida: 09.20 h Cerdanyola del Vallès', 'Agafeu el tren R4 - Renfe Rodalies Manresa - Sant Vicenç de Calders direcció Vilafranca del Penedès (estació de tren) (50 min)', and 'Baixeu a Molins de Rei (Estació de Tren)'. The arrival time is 10:10 h.

Screenshot 3 (09:23 AM): This screen shows the detailed view of the recommended itinerary (R4) with a focus on the walking and bus segments. It shows the departure time (09:20 h), arrival time (10:59 h), and duration (01 h 39 min). The itinerary details are: 'Sortida: 09.20 h Cerdanyola del Vallès', 'Agafeu l'autobús Autobús Barcelona (Collblanc)-Torrelles de Llobregat (L62) direcció c. Major - Bosc de les Ànimes (23 min)', and 'Baixeu a Raval Roig - Rtda. Cesalpina (A)'. The arrival time is 10:10 h.

- Using **TMB App**: This App is not able to search for a route originating from the Municipality of Cerdanyola del Vallès.





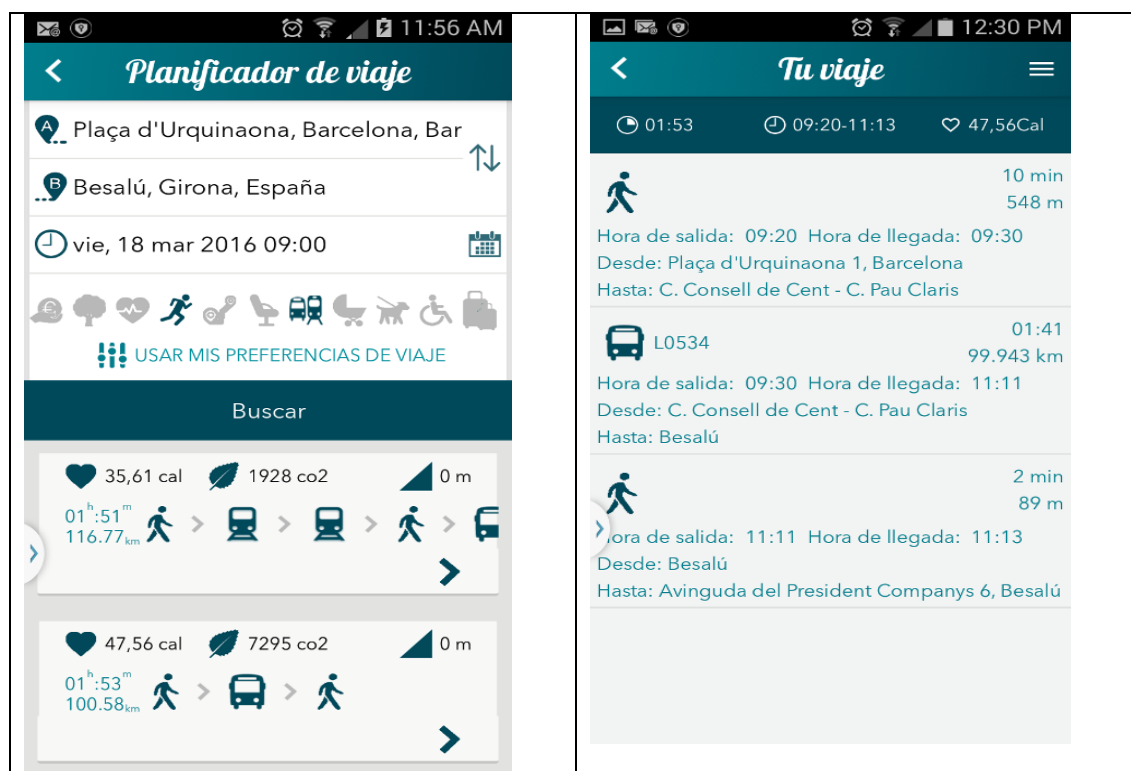
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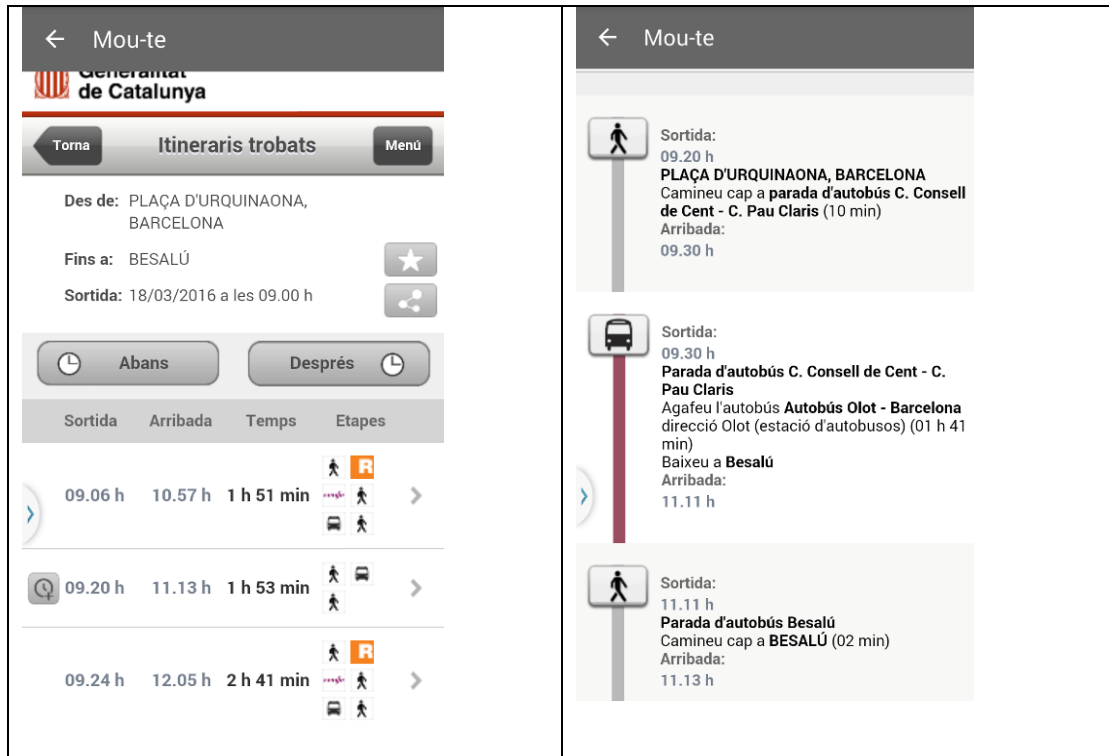
CASE 7: INTERURBAN ROUTE

Search from an address in Barcelona (Urquinaona Square) to the municipality of Besalú (located in the area of Girona). From the point of view of the user, the best result is taking the bus line from Barcelona-Olot (L0534 line).

Using MyWay: MyWay shows the user's recommended itinerary in the second position.



- Using **Mou-te**: It shows in the second position the recommended option chosen by the user.



Mou-te

Generalitat de Catalunya

Torna Itineraris trobats Menú

Des de: PLAÇA D'URQUINAONA, BARCELONA

Fins a: BESALÚ

Sortida: 18/03/2016 a les 09.00 h

Abans Després

Sortida	Arribada	Temps	Etales
09.06 h	10.57 h	1 h 51 min	Walking, Bus, Walking
09.20 h	11.13 h	1 h 53 min	Walking, Bus, Walking
09.24 h	12.05 h	2 h 41 min	Walking, Bus, Walking

Mou-te

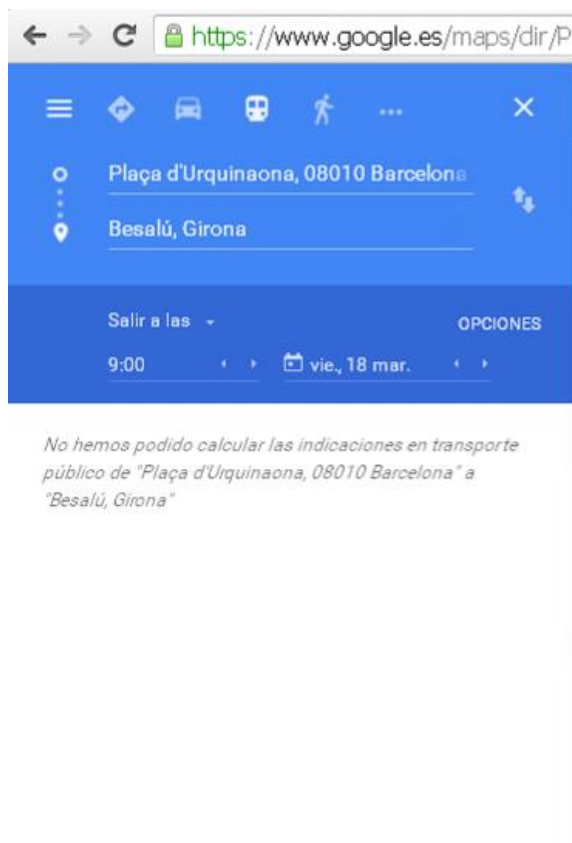
Sortida: 09.20 h
PLAÇA D'URQUINAONA, BARCELONA
 Camineu cap a parada d'autobús C. Consell de Cent - C. Pau Claris (10 min)
 Arribada: 09.30 h

Sortida: 09.30 h
Parada d'autobús C. Consell de Cent - C. Pau Claris
 Agafeu l'autobús **Autobús Olot - Barcelona** direcció Olot (estació d'autobusos) (01 h 41 min)
 Baixeu a Besalú
 Arribada: 11.11 h

Sortida: 11.11 h
Parada d'autobús Besalú
 Camineu cap a **BESALÚ** (02 min)
 Arribada: 11.13 h

- Using **TMB App**: This App can not obtain results for this search, because the Municipality of destination (Besalú) does not belong to Metropolitan Area of Barcelona.

- Using **Google**: Google can not calculate any result taking public transport from Barcelona to Besalú.

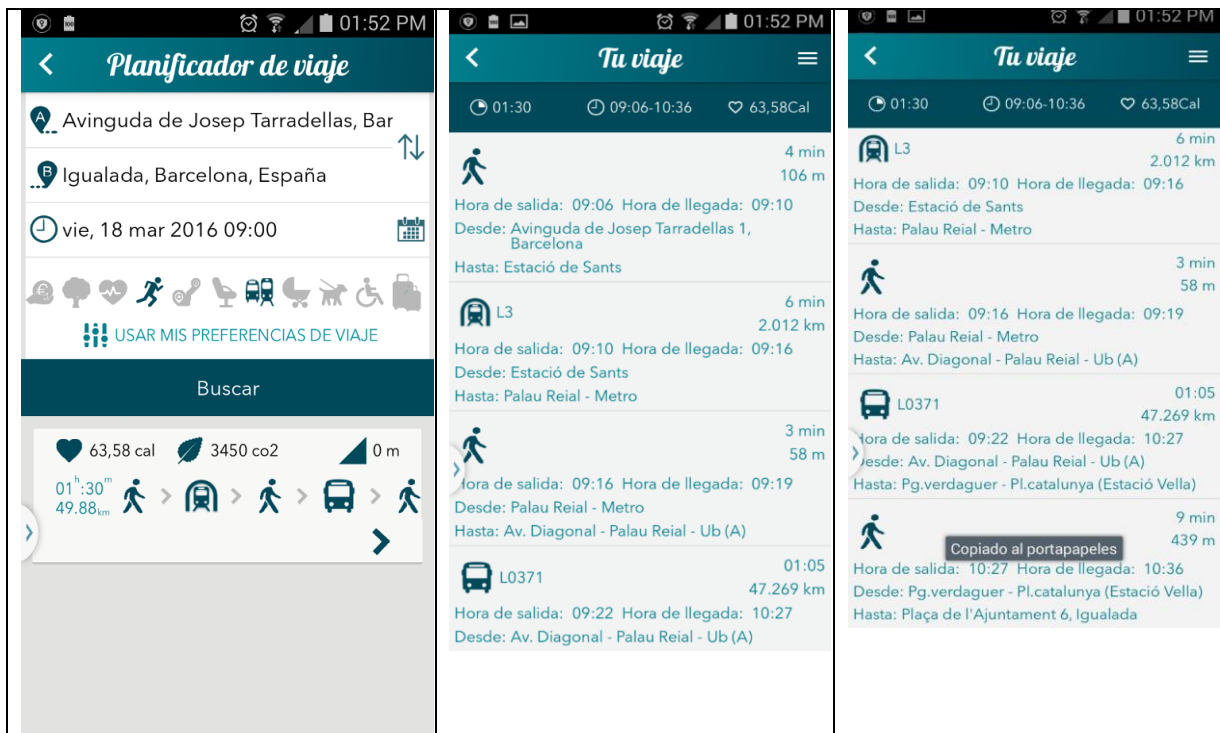


CASE 8: INTERURBAN ROUTE

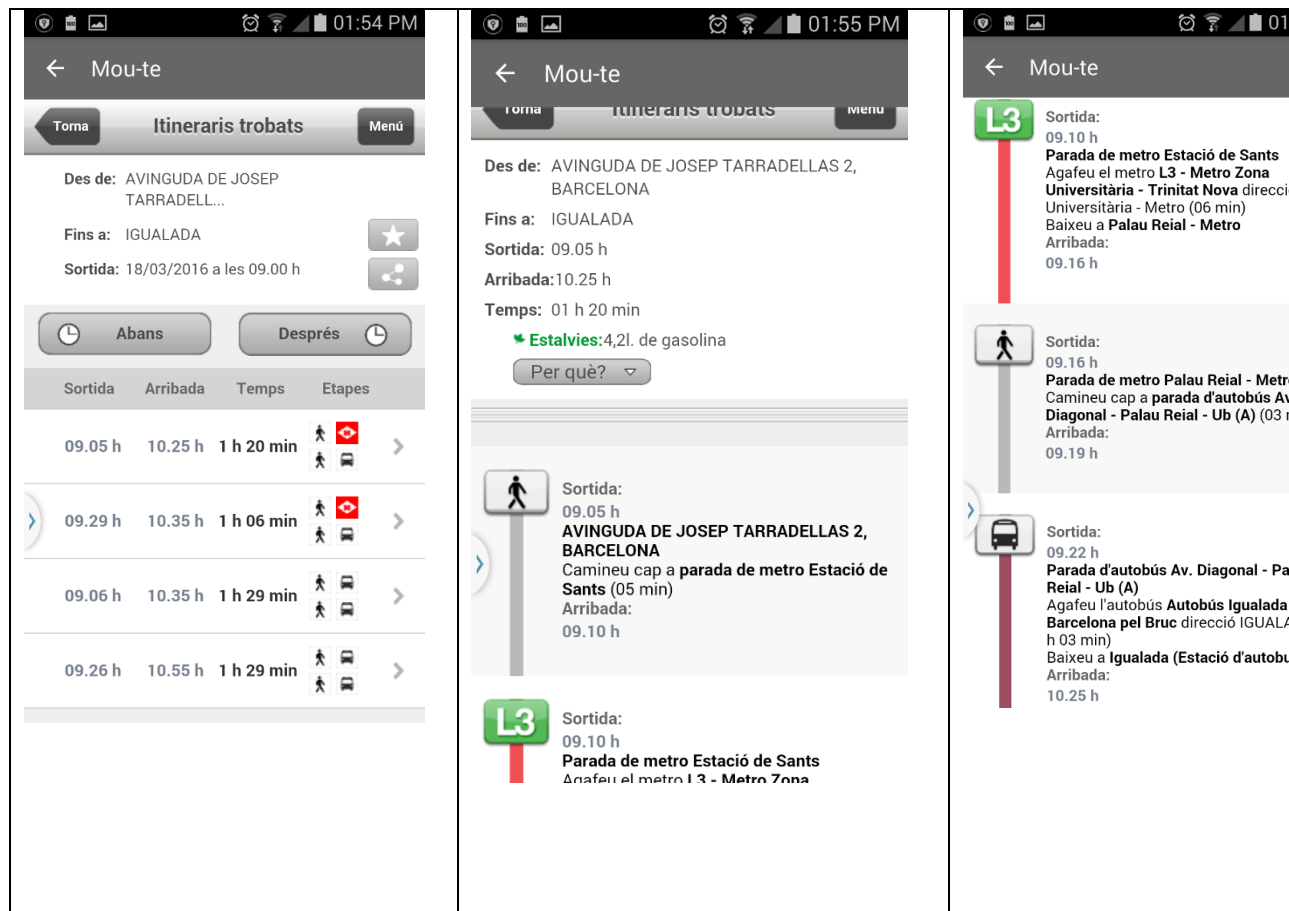
Search from an address in Barcelona (Josep Tarradellas 2 Avenue –DTES headquarter) to the Municipality of Igualada.

From the point of view of the user, a good option to make this trip is taking the Metro Line 3 Green and after the bus line L0371.

- Using **MyWay**: MyWay shows this option when the user ticks some preferences, such as taking the transport public and a fast trip.



- Using Mou-te: Mou-te shows the result suggested by the user as a first option.



The screenshots show the Mou-te app interface for a journey from Avinguda de Josep Tarradellas 2, Barcelona to Igualada. The first screenshot shows the search results with a table of options. The second and third screenshots show detailed views of specific route options.

Sortida	Arribada	Temps	Etales
09.05 h	10.25 h	1 h 20 min	[Icons: walking, bus]
09.29 h	10.35 h	1 h 06 min	[Icons: walking, bus]
09.06 h	10.35 h	1 h 29 min	[Icons: walking, bus]
09.26 h	10.55 h	1 h 29 min	[Icons: walking, bus]

Route Details (from second screenshot):

- Des de:** AVINGUDA DE JOSEP TARRADELLAS 2, BARCELONA
- Fins a:** IGUALADA
- Sortida:** 09.05 h
- Arribada:** 10.25 h
- Temps:** 01 h 20 min
- Estalvis:** 4,2l. de gasolina
- Per què?** [Dropdown menu]

Route Details (from third screenshot):

- L3** Sortida: 09.10 h
- Parada de metro Estació de Sants**
- Agafeu el metro L3 - Metro Zona Universitària - Trinitat Nova**
- Universit ria - Metro (06 min)**
- Baixeu a Palau Reial - Metro**
- Arribada:** 09.16 h

- Using **Google**: Google shows several options to go from Barcelona city to the Municipality of Igualada using and combining different transport public modes (train such Rodalies or Ferrocarrils de la Generalitat) but in this way the trip will take longer than following the recommendations of our user (metro L3 + bus).

