Ex ante evaluation - Area of Almada
Deliverable 6.2

Agência Municipal de Energia de Almada, AGENEAL

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1 Introduction

1.1 Background

The SmartMove project addresses key action on energy-efficient transport of the Intelligent Energy Europe programme (STEER). In line with the Transport White Paper it focuses on passenger transport and gives particular emphasis to the reduction of transport energy use.

1.2 The SmartMove project

The delivery of public transport (PT) services in rural areas is faced with tremendous challenges: On the one hand the demographic dynamics of ageing and shrinking societies have particular impacts on the PT revenues depending on the (decreasing) transport demand. On the other hand, PT stops density and the level of service frequency are often of insufficient quality. Thus, there is a need for the development of effective feeder systems to PT stops and for the adaptation of the scarce PT resources to user needs. For the SmartMove project, feeder systems are the different ways of linking a specific region with the back bone PT system, usually a bus or train network or a combination of both. This can be done by improving the walking and cycling facilities to and around the stations, by implementing flexible bus systems or by promoting carpooling or car sharing etc.. However, even if sufficient rural PT systems are available, large parts of the population face diverse subjective barriers to use PT. This is even more relevant for PT feeder systems: in many cases citizens are not even aware of their existence or, if they are aware of them, there exist subjective barriers to their use.

These problems are addressed within SmartMove by implementing "Active Mobility Consultancy" (AMC) campaigns for PT lines and their feeder systems in eight rural and peripheral areas. The objective of the AMC campaigns within the project aims at promoting the use of PT via personalised travel marketing approach. The word 'active' in the term "active mobility consultancy" has a twofold meaning. On the one hand, it refers to the active process of informing people on PT: it is not PT users, who have to inform themselves about PT services; rather the PT operators that have to inform their (current and potential) customers according to their individual needs. For this purpose, current and potential PT users are contacted to provide them with demand based information via different communication channels. The second meaning refers to several active measures aimed at decreasing subjective barriers such as overestimating prize and travel time whereas underestimating the supply and options to the use of rural PT systems.

The AMC campaigns are more than purely the provision of information: active measures will be offered in addition to the written information and the consultancy talks that are usually applied in similar campaigns. This might include actions like practical traveller training, citizen participation in planning or guided tours for PT feeder schemes. Additionally, information and feedback on user needs can be

collected within the AMC campaign. This supports the adjustment of PT offers in line with users' requirements.

The AMC concept used in SmartMove builds on existing approaches, which will be further developed through SmartMove based on the exchange of experience and mutual learning. In particular, we will develop existing AMC approaches along 4 lines:

(i)   the adaptation of the existing approach to recent developments,
(ii)   the consideration and inclusion of feeder systems into the AMC campaign,
(iii)   the development and application of a common monitoring and evaluation method and,
(iv)   the adaptation of the AMC concept to specific requirements of the implementing regions.

The result is an easy to use AMC concept that can be applied by PT operators all over Europe. The aim is to solve the specific, significant challenges of PT schemes in rural areas.

A main pillar of the concept is the extension of the AMC concept to PT feeder systems as they are crucial factors for rural PT systems. Better knowledge gained on this subject helps to improve public transport in rural areas. From a scientific point of view, the information attained about a feeder system based AMC campaign makes an important contribution to the further development of personalized travel marketing approaches. Even more important, by implementing a large range of dissemination activities, such as webinars and take-up seminars, not only the SmartMove partners, but also a broad range of stakeholders are informed about the manifold possibilities and advantages of an AMC campaign.

Eight rural and peripheral regions in Europe prepare, implement and evaluate a local Active Mobility Consultancy campaign. PT operators achieve insight into the demands of both current PT users and those who do not currently use PT systems, by applying the AMC campaign. If the non-use of PT is caused by hard facts – e.g. the location of the PT stops or schedule organization – PT operators can adapt their services to the demand of potential users. This will increase opportunities to make PT systems attractive for new passengers. Each of the AMC campaigns to be conducted through SmartMove will be based on a shared methodological approach which will then be tuned in practice to the needs of the local specific situation. These include the specific target groups, the specific cultural barriers, barriers and enablers, the type of PT feeder system (a possibility to reach PT stops by individual or public means), the spatial aspect (e.g. compactness vs spread, topography and geography, environment), the socio political aspects at the appropriate decision making level, the administrative aspects, the economic aspect and the planning aspects. Within each region, we have defined targets of several hundreds of households to be contacted. As a result, we expect a substantial mode shift to public transport, which in turn will lead to a substantial increase on energy efficiency, a decrease of resources consumed and a reduction of the greenhouse gas emissions caused by road traffic.

1.3 Content of this Deliverable

The impacts of the AMC campaigns are evaluated in a process- and output evaluation. Output evaluation refers to the measurement of the direct quantitative effects of the campaigns, e.g. mode shift or the number of additional public transport passengers. This information is used as input to calculate secondary effects of the campaigns, e. g. the reduction of CO_2 emissions. Based on this, a cost-benefit analysis and a cost-effectiveness analysis are calculated. Statistical figures of the process are collected at each stage of the campaign, e. g. number of people contacted, response rate, figures about materials ordered etc., in order to identify factors of success or failure of the AMC campaigns (process evaluation). Interviews with current and potential public transport users give additionally information to public transport operators about customer satisfaction and the needs of improvement.

The aim of this deliverable is to present and evaluate key figures that had been collected before the AMC campaigns were conducted. The profile of the implementation area contains relevant information on socio demographic factors and the existing mobility behaviour of the inhabitants and participants. These framework conditions may help to explain divergent campaign impacts amongst the different implementation areas in the later stages of the project. The variables describing the characteristics of the participants of the campaign are the core elements of evaluation. Furthermore this deliverable presents the participants' diverse motivations to use or not to use public transport services as well as the responses obtained from the people who chose not to participate prior to the campaign.

2 Data collection

2.1 Data collection – profile of implementation area

A literature review was carried out to obtain the relevant information for the profile of the implementation area of Almada. The sociodemographic figures have been retrieved from the 2011 Census data provided by the Portuguese National Institute of Statistics. Particular information regarding the Municipality of Almada was also obtained from the publication "Território e população - Retrato de Almada - Censos 2011" ("Territory and population - Portrait of Almada - 2011 Census"), which was produced by Almada City Council and offers most of the required data for the implementation area.

A municipal mobility survey "Inquérito à Mobilidade de Almada 2015" ("Almada Mobillity Inquiry 2015), which was funded by AGENEAL together with Almada City Council, and carried out in 2015 provided the data for the evaluation of the inhabitants' mobility pattern of the implementation area. This report is not published yet.

2.2 Data collection - situation before

MS-excel based data sheets have been prepared for all local implementation partners to be filled in for each person. The structure of the excel file includes the name of the variable; a short description and the format (open text, integer, date, pre-defined answers to be selected by a drop down button). Data are collected for each person individually, i. e. data of a person are entered individually in one row of the data base.
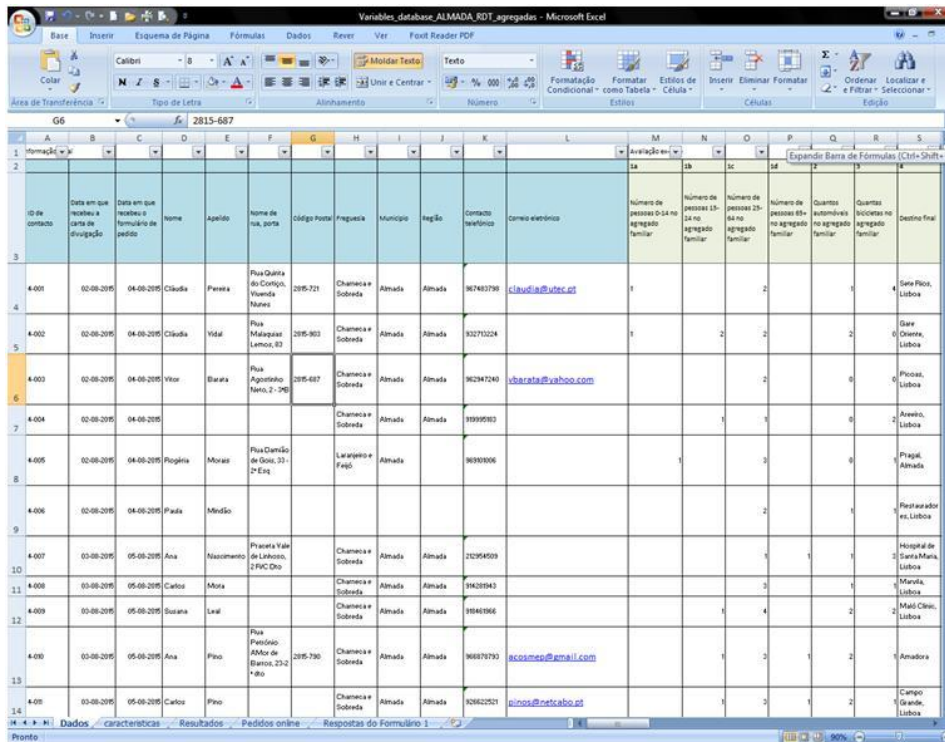
The data collection is structured as follows:

- General information (address and names of target persons, dates of contacts, information if the person is a public transport user or not etc.)
- Information concerning the questionnaire to be carried out before the campaign (modes used last week, knowledge about the particular line, rating of the performance of the particular line, suggestion for improvements etc.)

Figure 2-1 shows the MS Excel input form which was used for the implementation area of Almada.

The information was collected from the participants primarily by a door-to-door survey, together with the distribution order form. The obtained information was afterwards entered into the MS Excel input form.

Figure 2-1: Screenshot of the MS Excel based database used in the implementation area of Almada

3 Profile of implementation area

The implementation area Almada is located on the south bank of the Tagus River across from Lisbon (which is the capital of Portugal). Almada is one of the 18 municipalities that compose the Lisbon Metropolitan Region and is itself subdivided in 11 parishes. The SmartMove project is only implemented in one of these parishes, Sobreda. The SmartMove implementation area covers a total area of 6.2 km^2 and has a combined population of 15 166 inhabitants, which account for about 9% of the area and population of the whole Municipality [Portuguese Census 2011].

The increase of population in the urban outskirts like the SmartMove implementation area, which are less well served of public transport infrastructure, combined with the decline of the population of the city center, raises issues of mobility because of the growing number of commuters that have lower density public transport available. This is the case for the Parish of Sobreda, which increased its population by about 40% between 2001 and 2011. The gross regional product for the NUT III Region of the Peninsula of Setúbal is 12 302 € per capita [Portuguese Census 2011]. There is no specific data available for the Municipalitiy of Almada or the Parish of Sobreda.

Figure 3-1: Map of the implementation area (Municipality of Almada and Parish of Sobreda)

Table 3-1: **Profile of the implementation area Almada (population and transport demand)**
[Almada City Council "Mobility inquiry 2015", National Institute of Statistics
"Portuguese Census 2011", AGENEAL "SMARTMOVE ex-ante questionnaire" 2015]

Category	Variable name	Variable label	[Unit]
Implementation Area	**Area**	Area total	6,2 (whole Municipality 70,2) [km²]
Population	**Population**	Inhabitants total	15 166 (whole municipality 174 030) [number]
		Population change over the last decade	+40.2 [%]
	Gender	men	48 [% of total number]
		women	52 [% of total number]
	Age	age class (< 18 years old)	21 [% of total number]
		age class (18 - 64 years old)	62 [% of total number]
		age class (> 64 years old)	17 [% of total number]
	Professional status	employed	44 [% of total number]
		unemployed / home duties (incl. pensioners**)**	38 [% of total number]
		in school / training	18 [% of total number]
	Educational status	primary education	17 [% of total number]
		secondary education	46 [% of total number]
		higher education	35 [% of total number]
Transport demand	**Modal split**	Car incl. motorcycle drivers	65 [%]
		Motorcycle riders (available only in combination with car)	n.a. [%]
		Car or motorcycle passengers *(available only in combination with drivers)*	n.a. [%]
		Public transport	26 [%]
		Cycling	0 [%]
		Walking	8 [%]
	Trip rate	Number of trips per workday and person	2.3 [trips/day]

Table 3-1 presents the sociodemographic figures of the implementation area. Relating these data to the municipal average, the population of Almada Municipality increased 8% over the last decade, which is above the national average of 2% although well below the increase of population registered in the parish of Sobreda [Portuguese Census 2011]. This can be explained by the migration of population from Lisbon (which lost about 4% of its inhabitants between 2001 and 2011) to surrounding new residential areas in Municipalities like Almada (where housing and general cost of living are cheaper). The gender ratio matches the Almada Municipality and National-wide figures, while the age distribution of the implementation area shows a slight shift towards a younger population. 21% of the population are under 18 years and 62% are between 18 and 64 years in the implementation area, which is

above the municipality and national average (of about 20% and 60%, respectively) and [Portuguese Census 2011]. In the implementation area, 17% of people are over 64, compared to 21% in the whole Municipality of Almada and 19% nationwide. The figures in the category 'professional status' of the population of the implementation area reveal that the percentage of people 'in school or training' (18%) is similar to the whole municipality, but below the national average of 22% [Portuguese Census 2011]. The share of 'employed' people is slightly above municipal and national average, while 'unemployed' is slightly below. Within the implementation area 44% of the population are employed and 38% are unemployed, whereas in the whole municipality 38% are employed and 40% are unemployed [ibid.].

Looking at the figures for 'transport demand', private car is the most used mode of transport. Motorised private transport is used with a share of 65%. The modal split for the Municipality of Almada shows slightly lower numbers, with 50% of the trips made by private transport [Almada Mobility Inquiry 2015]. The share of public transport use in the implementation area is 26%, below the 34% from the whole municipality, according to the most recent mobility survey. This can be attributed to the specific geographical factors, motorization rate and free parking availability, and lack of competitive PT services provided in the implementation area. The share of active transport modes, "Walking" and 'Cycling', in the implementation area is 8%, about half of the average for the whole municipality of Almada [ibid.]. The share of each transport mode can also be seen in figure 3-1 below.

The mean number of trips per person and workday of the implementation area is 2.2, in line with the average for the whole Municipality [ibid.].
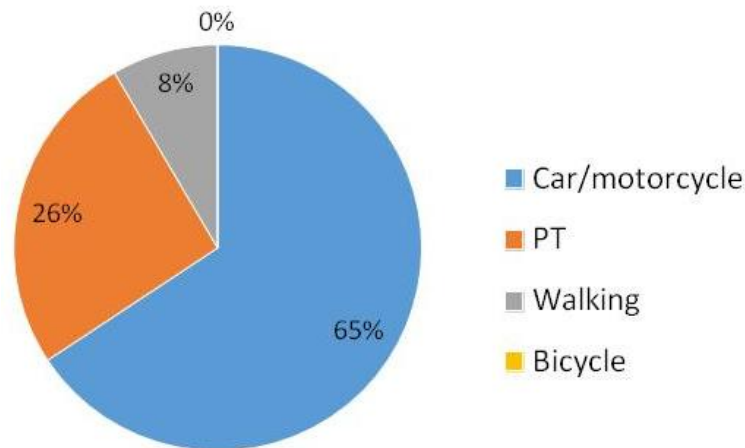
Figure 3-2: Modal Split of modes used in the implementation area [Almada City Council "Mobility inquiry 2015"]

Table 3-2: **Profile of the implementation area Almada (public transport) [**Almada City Council "Mobility inquiry 2015", SulFertagus, 2015 and TST - Transportes Sul do Tejo, 2015**]**

Category	Variable name	Variable label	[Unit]
Public transport		Number of bus-lines in the area	1 (Sulfertagus), 11 (TST) [number]
		Number of connections per line, direction and workday – SulFertagus Line 1P	23 [number/day]
		Number of connections per line, direction and Sat, Sun, public holiday - SulFertagus Line 1P	8 [number/day]
		Number of connections per line, direction and workday – TST Lines	2 – 39 (average 16) [number/day]
		Number of connections per line, direction and Sat, Sun, public holiday - TST Lines	0 – 24 (average 9) [number/day]
		Number of seat km per workday in the area	n.a. [seat km per workday]
		Average trip length of PT-users	24 [km]

Table 3-2 shows the public transport figures of the implementation area. The bus line SulFertagus 1P operate across the implementation area in the parish of Sobreda. This bus line has 23 connections per direction and workday, and 8 on weekends and holidays. Another private bus operator (Transportes Sul do Tejo – TST) operates 11 bus lines that cross the implementation area. However, although the geographical coverage of these lines is reasonable, the number of connections is low, with some of these lines having only 2 connections per direction on workdays and 0 on weekends and holidays. Additionally, from these 11 lines only one (Line 197) circulates between Sobreda and the rail station of Pragal (possibly serving as a feeder line), with ate leat 1h waiting times and only 14 circulations per direction on workdays and 6 on weekends and holidays, which is less than adequate for commuters.

The average trip length of public transport users in the implementation area is 24 km, an estimation is based in the results of the 2015 Mobility Inquiry of Almada.

Table 3-3: **Profile of the implementation area Waldviertel-Wachau (private car)**
[TREMOVE 2009, Almada City Council "Mobility inquiry 2015", ODYSSEE-MURE Project]

Category	Variable name	Variable label	[Unit]
Private car		car ownership rate [Mobility Inquiry 2015]	474 (whole Municipality 404) [cars/1,000 inhabitants]
		average trip length [Mobility Inquiry 2015]	24 [km]
		Average fuel consumption per car [ODYSSEE 2013] [1]	0.0689 [l/km]
		Average CO2 emission per car [TREMOVE 2009] [1]	183 [g/km]
		Average trip duration [Mobility Inquiry 2015]	23 [min]

[1] This variables are related to whole Portugal, no detailed information is available here.

The key figures for the category 'private car' can be seen in Table 3-3 above. Car ownership rate of the implementation area is 474 cars per 1000 inhabitants. This value significantly exceeds the Municipality average of 404 cars [Almada Mobility Inquiry 2015], and the national average of 443 cars per 1000 inhabitants [EUROSTAT 2012]. The average trip duration of the implementation area is 23 minutes per trip[Almada Mobility Inquiry 2015].

4 The situation before the implementation

Two aspects have been collected before the campaign:

- Variables describing the characteristics of participants of the campaign.
- Variables describing characteristics of those, who were contacted, but not participating in the campaign.

4.1 Participants of the campaign

Variables collected from participants are the core elements of evaluation of the campaign. The following information was collected to enable an impact analysis after the campaign has been carried out. To document a change in the participant's mobility pattern, their use of different modes of travel have been documented before the campaign takes place. Furthermore the participants have been asked to name their reasons for using or not using the available public transport services in the implementation area. The participants were also asked to list possible improvements of the bus line services.

Table 4-1:   Variables for reporting situation before – modal split of participants

Category	Variable name	[Unit]
Modal split of participants	Car drivers	50 [%]
	Motorcycle riders	2 [%]
	Car or motorcycle passengers	5 [%]
	Public transport	30 [%]
	Cycling	2 [%]
	Walking	12 [%]

Table 4-1 presents the data obtained by the answers to the questions inquiring after the weekly usage of the specific travel modes, which is also illustrated in percentage shares in figure 4-1 below. There were some difficulties from the respondents in interpreting the usage of the transport modes (e.g. some considered 'walking' to the PT stop or final destination as a transport mode, while others didn´t), which provided inconsistent results in this subject. For this reason, modal share was calculated without accounting for the average usage days per week. As expected, motorised private transport is the most popular travel mode, with a modal share of 57% (riders and passengers). The average participant uses the car 4.94 days per week as a driver and 3.52 days per week as a passenger. The second most popular travel mode is public transport with a 30% modal share and an average of 4.58 days per

week. Bicycle has a modal share of 2% and is used 2.70 days per week. Walking has a modal share of 12% and is used 4.32 days per week.

In comparison to the modal split of the implementation area, shown in figure 3-1, it is apparent that the participants have a lower percentage in private car use and higher percentage in the usage of public transport and active modes, which indicates that the people willing to participate in the AMC campaign are more likely using public transport for their travels than the average resident of the parish of Sobreda, although at a lower level than the average resident of the Municipality of Almada.
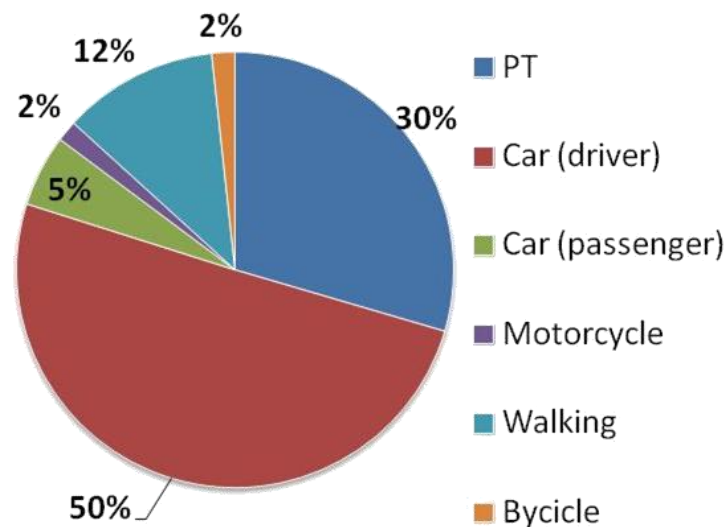

Figure 4-1: Modal Split of participants

Table 4-2: Variables for reporting situation before – line usage of participants

Category	Variable name	[Unit]
Usage of line of participants	People, who know SulFertagus Line 1P	90% (378 out of 419 people)
	People, who never use SulFertagus Line 1P	69% (288 out of 419 people)
	People, use SulFertagus Line 1P less than once a month	29% (37 out of 131 people)
	People, use SulFertagus Line 1P less than once a week	4% (5 out of 131 people)
	People, use SulFertagus Line 1P at least once a week	67% (87 out of 131 people)
	Average rating of performance SulFertagus Line 1P	6.75 out of 10 [1] (n=131 people)
	Average number of days of those people using SulFertagus Line 1P at least once a week	3.03 days a week (n=131 people)
	People possessing season ticket for the public transport	69% (157 of n=226 people who use PT)

[1] Where 1 equals poor and 10 equals best performance

The bus lines are known to a majority of 378 out of 419 respondents (90%) but 69% of these respondents never use the lines, and 29% of the 129 users of SulFertagus service use it less than once a month. However, 67% of the participants that use SulFertagus service use the line at least once a week, which is significant. On average, the participants who use the bus lines at all use them 3.03 days a week. 69% of the 226 respondents that use public transport possess a season ticket which is also significant. The performance rating of 6.75 points shows high satisfaction with the bus lines in general.

Reasons for using/not using the public transport line and possible improvements have been collected by open answers, and classified in order to be able to compare the results between the different implementation areas. The list of answer categories from the first draft (see Deliverable D6.1) has been extended based on the open answers given by the participants. The additional categories are marked green/italic style.

Table 4-3: Classification of open answers – main reasons for not using SulFertagus Line 1P

Main Reasons	n=330 responses from 260 people	[%] - of people have named this reason
No interest or need for service	79	24%
Travel comfort	74	22%
Time table – frequency of links	48	15%
Inadequate Route	41	12%
Cost, Ticket tariff	32	10%
Travel time	17	5%
Location of PT stop	13	4%
Time table – operation time	11	3%
Other PT modes used instead	7	2%
Time table – links to other lines	5	2%
Need to change lines to often	1	0%
Lack of information about the service	1	0%

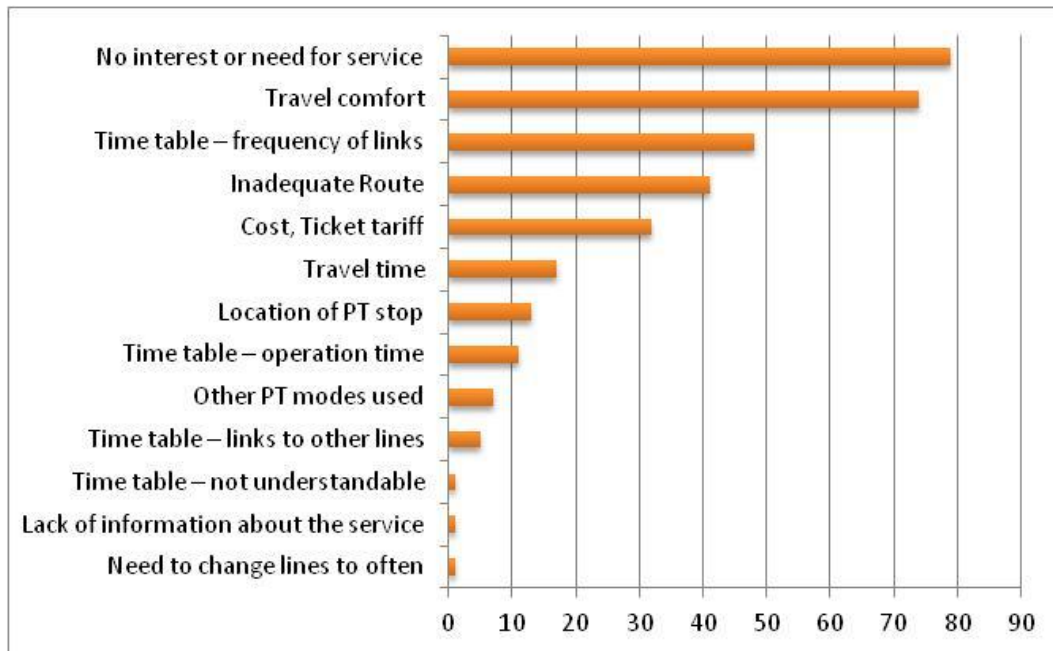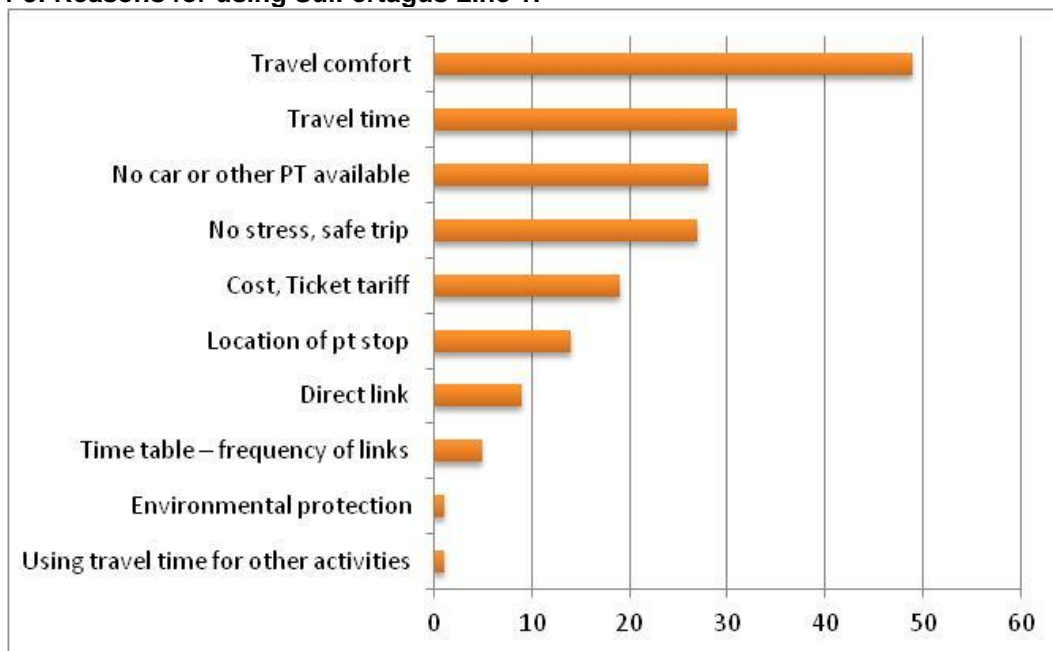**Figure 4-2: Reasons for not using SulFertagus Line 1P**

Table 4-4:   Classification of open answers - reasons for using SulFertagus Line 1P

Reasons	n=184 entries from 129 people	[%]- of people have named this reason
Travel comfort	49	27%
Travel time	31	17%
No stress, safe trip	27	15%
No car or other PT available	28	15%
Cost, Ticket tariff	19	10%
Location of PT stop	14	8%
Direct link	9	5%
Time table – frequency of links	5	3%
Using travel time for other activities	1	1%
Environmental protection	1	1%

**Figure 4-3: Reasons for using SulFertagus Line 1P**

Major reasons for not using the bus service provided by SulFertagus are the lack of interest or need (24%) and travel comfort (22%), which is naturally a subjective perception but one which influences travelling behaviour. Other frequently raised reasons for not using the bus line are related to timetables (15%), inadequate route (12%) and prices (10%). The subjective nature of these perceptions is evidenced by the 27% of respondents that said that travel comfort is the main reason for using the bus. Also, travel time (17%), lack of other alternatives (15%), stress/safety (15%) and prices (10%) are considered important reasons to use the SulFertagus Line 1P.

Table 4-5: Classification of open answers - improvement suggestions for the PT service

Improvement suggestions	n=655 entries from 274 people	[%]- of people have named this reason
Time table – operation time	175	27%
Time table – frequency of links	135	21%
Cost, Ticket tariff	90	14%
More flexibility (demand responsive service)	86	13%
Time table - more info on bus stops	69	11%
Travel comfort	56	9%
Location of PT stop	44	7%

Figure 4-4: Improvement suggestions
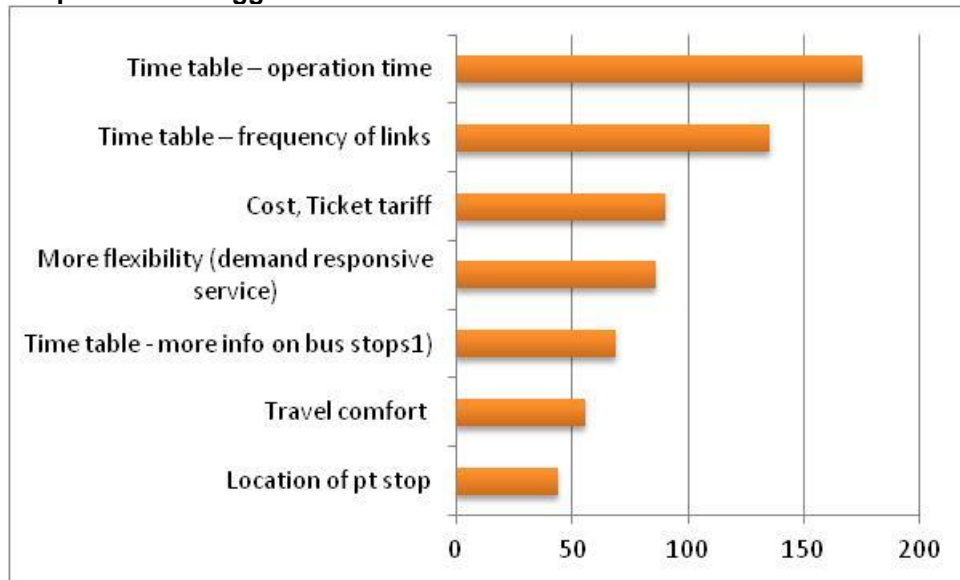
Main issues for improvement are related to the temporal density of the public transport supply (in terms of frequency and operation time). Other points were raised less frequently (see figure 4-4).

4.2 Persons who did not participate in the campaign

It is always difficult to get information from persons who are not willing to participate in a survey or campaign. This was evident in the door-to-door survey, where people not interested in the campaign were suspicious and refused to open the door or respond to any questions.

5 Summary and conclusion

The Ex ante Evaluation presents the data collected before the implementation of the AMC-campaign in Almada. This includes figures describing the implementation area, the participants' mobility behaviour and their perception of the public transport services within their municipalities.

The variation in modal split is considerable when comparing the results of the participants and the general data of the implementation area. The modal split for the whole parish of Sobreda show a car usage of 65%, whereas the participants of the campaign exhibit a lower percentage of only 57%, which is nonetheless above the average for the Almada Municipality (50%). Equally notable is that the participants' usage of public transport (30%) exceeds the general percentage of the implementation area (26%).

The ratio of participants that stated using public transport services is 54%, of which a little more than half (58%) users of SulFertagus Line 1P. This bus line is known to 90% of the respondents. The average performance rating of the lines is 6.78 out of 10. Lack of interest or necessity, and travel comfort are most often given in answer to the question: what are the reasons of not using the public transport services. However, travel comfort is also the main reason for using the SulFertagus Line 1P. The major suggestions for improvement are the bus service operation time and the frequency of links. 15% of users are captive, i.e. have no other transport alternative.

Based on these findings the impact of the AMC-campaign will be assessed at a later stage of the SmartMove project. Furthermore the profile of the implementation area can be used as a frame of reference to allow comparability across the different implemention areas of the SmartMove project and analyse possible relations between these framework conditions and the campaign itself.

6 References

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