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## Measure Evaluation Results Control System for Dial and Ride Service

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## Executive Summary

Since 2005 a Dial and Ride system was established in Funchal to provide an appropriate mobility service to impaired people. The aim of the MIMOSA measure 'Control System for Dial and Ride Service' was to address this existing service to the entire population of a limited pilot area Santa Luzia, a neighbourhood located near the city centre. Due to the narrowness and steepness of the roads, Santa Luzia was not served by public transport before the MIMOSA measure. The establishment of a Dial and Ride system appeared to be an appropriate public mobility offer to the residents of this area. The principle of the system, called MOBI Santa Luzia, is based on a PT on-demand service: the citizens have to register to use the system (online or at the public transport operator offices); and to book their trips at least one hour before the expected departure by phone; then one of the public mini buses from the public transport operator - Horários do Funchal (HF) - will pick them up according to the pre-defined route, bus stops and timetable.

The measure was implemented in the following stages:

**Stage 1: International tender process to purchase mini buses** (October 2009) After having defined the technical requirements for buses according to the physical conditions of the area, HF launched an international tender process to purchase five mini buses co-financed by the Regional Funds Program (ERDF), one of these was bought in the frame of the other MIMOSA measure FUN 1.1 'Sustainable Fleet'.

**Stage 2: Preliminary report and research on technologies** (February - June 2010) A preliminary report about the current PT services in Santa Luzia was drafted providing data on the demand and supply. International experts were consulted during the elaboration of this report.

**Stage 3: Door-to-door survey of residents in Santa Luzia** (April 2011) To better define the service characteristics (namely bus stops, timetable and communication activities), HF conducted a door-to-door survey among residents in Santa Luzia and designed a communication plan based on these results.

**Stage 4: Definition of the service management** (June 2011) The establishment of a sophisticated control centre was foreseen to manage MOBI Santa Luzia system. Due to the lack of appropriate software to address the highly specific requirements addressed by HF and the delays in the measure process, it had been decided to use the same booking system as for the existing service for mobility-impaired people.

**Stage 5: Launch of the Dial and Ride service** (October 2011) An official demonstration of MOBI Santa Luzia took place during the CIVITAS FORUM 2011 in Funchal, targeting the local government and other politicians who attended the FORUM. Meanwhile, information brochures and fridge magnets with the phone number for MOBI Santa Luzia booking were disseminated to each household of the focused area. The service started one week after the CIVITAS FORUM in October 2011.

**Stage 6: Second phase of Dial and Ride service** (June 2012) Dial and Ride service was extended to a new street in Santa Luzia in June 2012 that was formerly served by a special taxi service (paid by the PT Operator) only to link the households located along the street to the nearest PT bus stop. This recent extension was important to slightly increase the service demand.

Since the Dial and Ride concept offered a new scheme of accessibility in steep areas, the measure was of high relevance for the local mobility policy and was selected as **focused measure**. Due to several delays in the measure process, the implementation started in late

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October 2011 which meant that the impact evaluation was only conducted on a seven-month period (until May 2012). Impacts of the measure were mainly assessed by acceptance (service) and accessibility (area) indicators. Additionally to the impact and process evaluation of the measure, it was initially planned to conduct a cost-benefit analysis for the measure. Nevertheless, due to the lack of data available the CBA has been cancelled.

The **key results** showed that the MOBI Santa Luzia system was highly appreciated by users but needs to be reviewed in order to enhance the efficiency of the system. The first key result concerned residents' acceptance and highlighted an excellent result since the overall score regarding satisfaction of residents in the system reached 10 which is the maximum score on a 1 to 10 scale. The second key result showed that a total of 1.384 passengers used the system, with an average of 1,5 passengers/per trip, between October 2011 and May 2012. These results showed that the measure failed in the task of convincing elderly people to use public transport (none of the new PT users are over 64 years old). The last key result showed that due to the low number of passengers/per trip, the fuel consumption of buses in MOBI Santa Luzia is ten times higher than in other urban area. Consequently, the level of emissions per passenger transported has a heavy negative impact on the overall air quality in Funchal.

One of the main **barriers** encountered during the process was the identification of the appropriate size of the pilot area to increase the efficiency of the system. Indeed, due to the Portuguese financial bail-out, the scale of the project was first limited to a small area. Nevertheless, during the process it had been proved that the system could not be efficient due to the low demand in the target area. Therefore, the system was expanded to an additional street in order to raise the numbers of potential users.

**One of the main drivers** was the expertise and experience of the PT operator to manage on-demand services. Indeed, the PT operator offered a service addressed to impaired people since 2005 and made use of its experience in the implementation of this measure such as booking, checking viability, scheduling and supplying issues.

The MOBI Santa Luzia system is a **replicable solution** to provide a PT service to a target population and to reach areas which are difficult to access by standard PT system. To implement a similar system **it is recommended** to conduct a demographic and social analysis of the potential users of the system in the selected area such as age, disability, transport mode commonly used and amount of trips per days. This preliminary study constitutes a crucial basis to define a context-oriented concept for the system. By involving the residents in the planning and decision-making process the system would be also better accepted and used by the population.

Even if the results of this measure showed that the system had not been environmentally efficient in the frame of the MIMOSA limited period of time, the positive acceptance of the residents and the satisfaction of the users with the service offered encouraged the measure team to continue to work on this concept. By connecting neighbourhoods such as Santa Luzia to the entire PT network of the city, the concept of Dial and Ride contributes to enhance the overall mobility quality of Funchal and to offer PT services to all citizens without social and physical distinctions.

## **A Introduction**

### **A1 Objectives**

The measure objectives are:

(A) High level / longer term:

- Promote modal shift towards public transport;
- Improved social inclusion;
- Improvement of quality of life.

(B) Strategic level:

- The objective is to promote public transport through innovative solutions that enable better quality of life and access to services for all social groups. A Dial and Ride service demands a responsive service that is widely used in rural areas with dispersed settlements. In Funchal, the main goal is to show that this collective passenger transport system can also be a suitable service for urban areas with high population density and very narrow streets, where standard buses cannot pass through;
- The demonstration will also test the feasibility of the service in a limited area. This can be a good solution for other parts of the island with low population density and easily exported to other sites throughout Europe.

(C) Measure level:

- (1) Extend Dial & Ride mobility service for a wider number of users in S. Luzia by testing a demand-responsive transport mode to which any citizens living or working in Santa Luzia can apply to.
- (2) Improve accessibility and social inclusion in the catchment area, where conventionally-sized buses are not able to access and the locals are mainly elderly people.
- (3) Provide a better service with fewer resources, costs and pollutant emissions per passenger and per kilometre by deploying small capacity buses on the PT service.

### **A2 Description**

The work under MIMOSA includes the expansion of Dial and Ride already existing since 2005, but only for mobility impaired people, to the general population in Funchal. This service has registered good results during the 3 years of operation so it was time to test this same model on a small pilot area where public transport had not been provided because the network is featured by narrow and steep roads. This way, the PT Operator (Horários do Funchal) could extend the service benefits to a wider number of users and especially to

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those who are more deprived (elderly people with reduced mobility according to the population Census of 2001) from mobility options.

The Dial and Ride service in Santa Luzia was implemented in an area right next to the city centre, although quite steep. The service implemented within MIMOSA was called MOBI SANTA LUZIA and is basically a PT service with pre-defined route, bus stops and timetable, So it can hardly be considered a completely flexible service. If no one books a trip in advance, the bus will not start the journey.

A person interested in this service has to subscribe himself in the service directly in HF website or in the HF sales and information outlets, and then book one or more trips by telephone at least one hour before the beginning of the trip. When the bus is travelling along the route, whoever wishes to get on-board at a designated bus stop can do it even if the journey was not scheduled.

If a person makes a reservation and does not use the service s/he will be penalized, after 3 times s/he would not be able to use this service again for a month. After another reservation without showing up one cannot use this service in future.

The fare for MOBI SANTA LUZIA is the same as the regular services of Horários do Funchal and the service is only available during the working days (not on weekends).

Using compact vehicles instead of conventional buses (9 meters), provided by 1 brand new mini-bus with less pollutant characteristics<sup>1</sup>, this service can transport general public passengers to very steep areas, with narrow roads. The buses that operate in this service can accommodate wheelchairs and people with other kinds of disabilities.

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Financed by Regional Development Fund Program (ERDF).

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Picture A.2.1: Public transport network map in Funchal and the 2<sup>nd</sup> phase of Dial and Ride



Picture A.2.2: 1<sup>st</sup> phase of Dial and Ride service (October 2011)

Picture A.2.3: 2<sup>nd</sup> phase of Dial and Ride service (June 2012)



## **B Measure implementation**

### **B1 Innovative aspects**

#### **Innovative Aspects:**

- **New conceptual approach, regionally** – the new service tested a Dial and Ride service for the first time on the island, not only for mobility impaired people. This measure gave the chance to the PT operator to evaluate the benefits and the risks linked with this new service. So it was possible to test a new transport system in this specific urban field which could be extended to other parts of the island with low population density.
- **New mode of transport exploited, within EU** – this new service introduced a new smaller bus adapted to the target area.
- **Targeting specific user groups, regionally** – the main target group of dial and ride service are the elderly people with difficult accessibility levels.
- **New policy instrument, regionally** – aimed at an area where mobility solutions were limited before this implementation.

### **B2 Research and Technology Development**

#### **Context and Purpose**

**Dial and Ride services is used** across many regions in Europe as a demand responsive transport service to geographically dispersed areas characterized by low density population. In Portugal, (Lisbon and Funchal) the service has been deployed mainly for mobility-impaired users.

The city of Funchal, on the other hand, thinks that this kind of service also plays a key role in different situations. This is why the PT operator undertook research to support testing compact mini buses so as to increase accessibility to very dense areas, with narrow roads, where the conventional buses cannot pass through, thus reducing social exclusion for the population who either live or work in the catchment area of this CIVITAS-MIMOSA measure.

#### **Study of the state of the art and the potential PT demand**

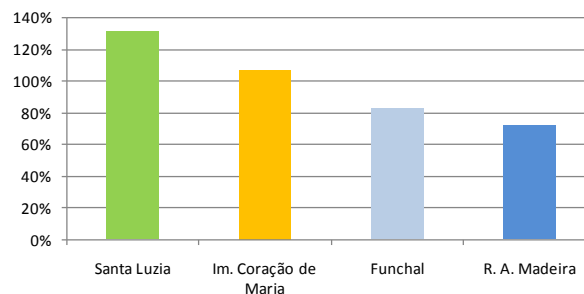
Santa Luzia area comprises a wide range of characteristics which make it a turning point for regular public transport deployment:

- According to the Mobility Study of the city of Funchal (2007), Santa Luzia has the highest motorization rate in all the city of Funchal (359 vehicles/1.000 inhabitants whereas the average of Funchal is down to 317).

- Accordingly, the number of PT users is one of the lowest in Funchal.

- The share of elderly people is higher in Santa Luzia than everywhere else in Madeira. These citizens often have to face severe mobility constraints which HF expects to curb by introducing Dial&Ride.

**Chart B2.1: Ageing index (census 2001)**



- At the top hill of Santa Luzia the slopes rise to 25% .

- The PT operator studied the technical requirements, considering the specific conditions of the zone, namely the high slopes, public transport demand and access to the interior of the buses. The studies revealed that mini diesel buses are the best solution for this area.

The HF technical team mapped the areas in Santa Luzia that are scarcely accessibility to public transport to support the decision-making of the final Dial and Ride catchment area.

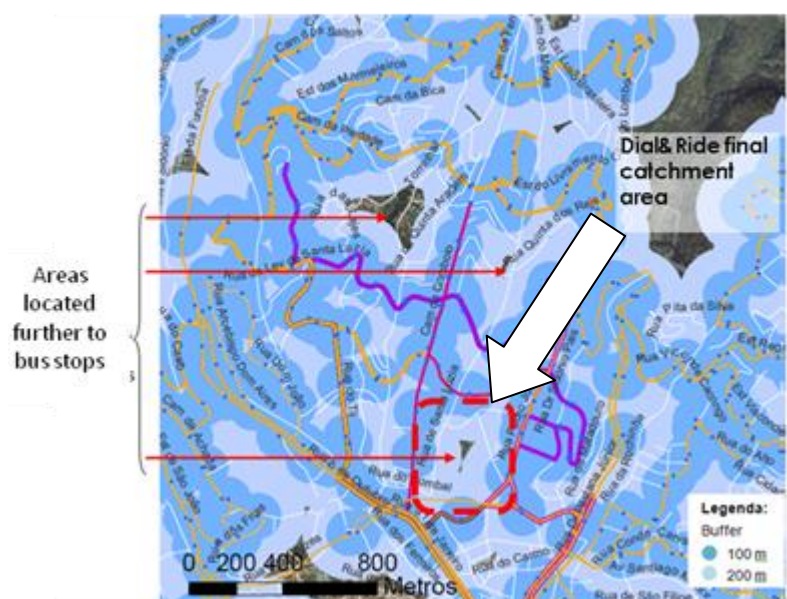
Facing severe economical constraints due to the overall Portuguese economical crisis (decrease in the stream of funds and public transport demand), the PT Operator considered that the Dial&Ride test should focus only on the centre of Santa Luzia, rather than on the city boundaries.

So one of the selected areas with less accessibility to bus stops was the chosen one to be used as pilot area for Dial and Ride. This enabled the service to increase the area coverage of Public Transport by 5% as foreseen in the measure description form.

After defining the catchment area, the PT team conducted a door-to-door survey of urban residents in Santa Luzia. This survey has had meaningful results, aiding to:

- i. Characterize the target group and understand if they use PT;
- ii. Being able to define the schedule and the location of bus stops (three of them, near the streets with more potential demand) that best suit their needs;
- iii. Understand whether people can transfer their modal option towards PT following the implementation of a Dial&Ride

**Picture B.1.1 Areas located further to bus stops**





service.

iv. In addition to this, the study information collected helped to draft a communication campaign.

A total of 178 respondents (average survey response rate of 35%), filled in the questionnaire 122 of which declared to be willing to use the new service. 64 out of these 122 (54%) are not PT users nowadays so the modal shift potential is quite high.

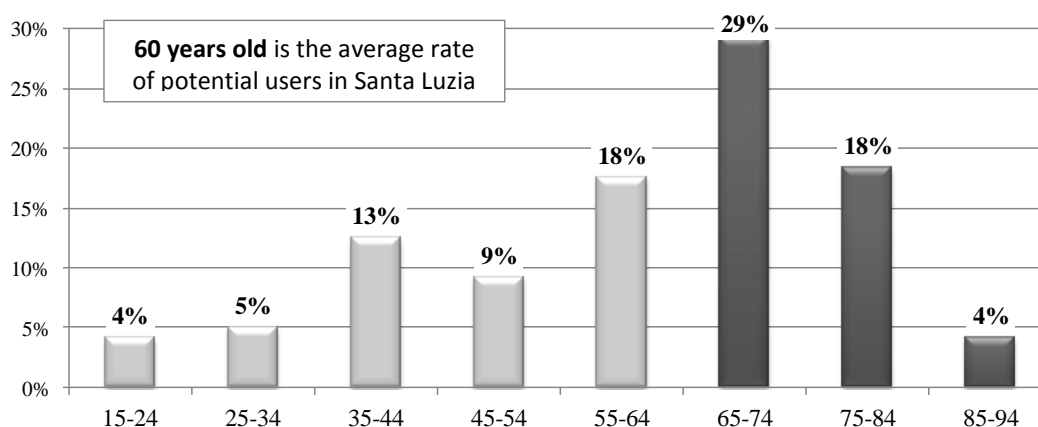
One may seek some major trends with case-studies carried out in other European cities. The previous studies point out the experiences of Heinsberg (Germany) with the Multi Bus, the Publicar in Switzerland, and above all the Drin Bus implemented in the city of Genoa (Italy) and expanded in the framework of the CIVITAS-CARAVEL project.

For example, whereas in Genoa Drin Bus users 62% had an age comprising between 25 and 60 years old, in Santa Luzia only 38% of the citizens who answered the questionnaire and say they will use the service in the future have an age of 20 to 59 years and a majority 61% of the citizens are between 60 and 89 years old.

In Genoa 40% used public transport prior to the implementation of Drin Bus. In Santa Luzia, on the other hand, only 28% actually use it (less than the average rate for Funchal which is of 33% according to the Mobility Study of the city).

52% comprise the total share of retired people and self-employed workers of the potential Dial&Ride users in Santa Luzia, which means that flexible transport solutions are required to match the interests of people who do not have regular and easily typified public transport routines. Hence, Dial&Ride in Santa Luzia fits well since the target audience do not have regular routines (most of them are retired), so their mobility habits are quite variable.

**Chart B2.2: Age of potential users in Santa Luzia**



Bearing in mind the main findings derived from the survey, we were able to trace down the potential demand, a proposal for the location of bus stops and for the route itself.

### **Dial and ride perception of usefulness**

To understand how useful a Dial and Ride service could be for Funchal citizens, the local team asked all those who attended Expo Madeira (in July 2010 and in July 2011), if people

regard Dial and Ride as useful for themselves: “Do you feel that public transport on demand would be useful for you (in a 1 to 10 scale (being 1 totally useless and 10 very useful)?” In 2010 the survey was applied to 792 individuals who either live or work in Funchal, and in 2011 to 806 citizens. It is important to notice that this survey was applied before the Dial and Ride started supplying public transport service in Santa Luzia.

**Table B2.1: Usefulness of Dial & Ride service of those who live and work/study in Funchal**

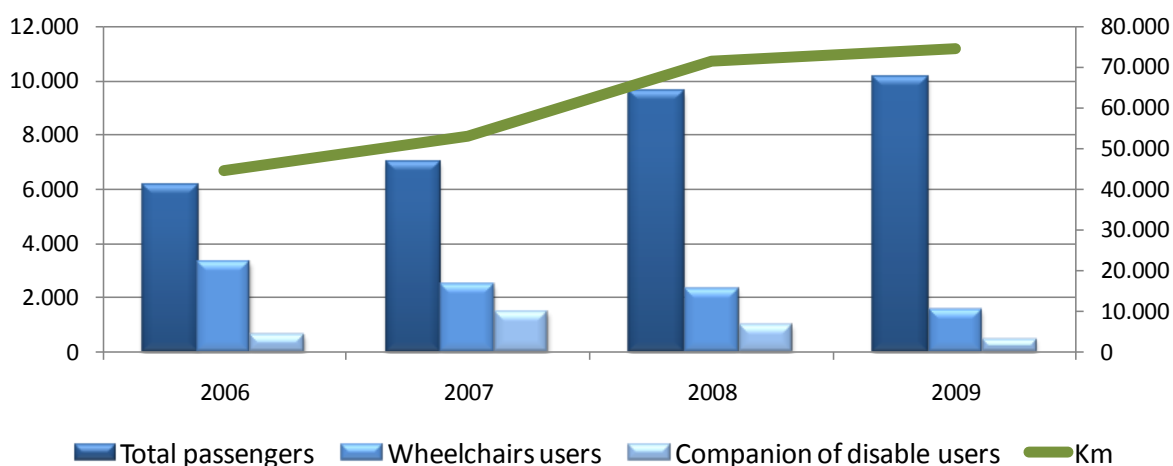
	July 2010		July 2011	
	Use PT	Use car	Use PT	Use car
Very unuseful	5%	5%	9%	5%
Unuseful	14%	17%	9%	5%
Useful	44%	40%	43%	35%
Very useful	25%	5%	20%	15%
Don't have an opinion	13%	17%	24%	29%
<b>Useful and very useful ratio</b>	<b>69%</b>	<b>45%</b>	<b>63%</b>	<b>50%</b>

The percentage of citizens who use PT and find the Dial & Ride useful or even very useful is higher than the citizens who use private cars. Nevertheless, the number of people who actually use a car and find this scheme useful for themselves is noteworthy (50% in 2011), which means that they welcome flexible public transport solutions.

### B3 Situation before CIVITAS

Funchal has a public transport service dedicated to disabled people which started in 2005. People who want to access the actual service must comply with some rules, namely: are physically unable to use standard service and have to book their own service by phone two days in advance. This service is actually processed without an electronic system to manage and optimize actual service benefits, like length and duration of the trips and scheduling.

**Figure B3.1: Main data about the service dedicated to disabled people**



**Table B3.1: Main data about the service dedicated to disabled people**

	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>
<b>Total passengers</b>	6.114	7.032	9.628	10.094
<b>Wheelchairs users</b>	3.286	2.453	2.310	1.537
<b>Companion of disable users</b>	607	1.456	988	477
<b>Km</b>	44.658	53.082	71.405	74.521

Despite the number of total passengers is increasing, the figures outline that the number of wheelchairs users is decreasing. This is explained by the possibility to use wheelchair in the urban regular service buses (20 buses equipped to transport wheelchairs since 2008 and 30 buses 2011). In 2010, the urban regular service transported 31 wheelchairs per month.

## **B4 Actual implementation of the measure**

The measure was implemented in the following stages:

### **Stage 1 – International tender process to purchase mini buses (October 2009) –**

After some studies about the specific conditions of the zone, namely the high gradients, public transport demand and technical requirements for buses, HF launched an international tender process to purchase 5 mini buses co-financed by the Regional Funds Program (ERDF), one of which was due to be operating in this measure.

**Stage 2 – Preliminary report about the actual PT service in Santa Luzia and research about technologies (February and June 2010) –** A preliminary report about the actual PT service in Santa Luzia, analyzing the demand and public transport supply in the target area was drafted. It was internally released (for further information, please check section B2). Telephone conferences were made with a Greek University, as well as with the Mobility Agency of Bologna to come over with an online application for scheduling bus trips and to provide an online template to visualize the planned trips. Following the realization that the georeferencing features of Funchal were fairly incomplete, HF made some contacts with Google Portugal that also failed to contribute for the control centre.

**Stage 3 – Door-to-door survey of residents in Santa Luzia (April 2011) –** This study helped to shape the final service characteristics of the service, namely with regards to timetable and location of bus stops. This study also supported the development of a communication plan.

**Stage 4 – Definition of the service design (June 2011) –** Backed up by the survey conducted with residents in Santa Luzia, who faced severe delays relating to the schedule of the measure. After several experiences to arrange an electronic booking operation base, the steering team decided to down-sized the measure, not changing anything in the special service for mobility-impaired persons, rather using the same dispatch office for both services.

**Stage 5 – Launch of the Dial and Ride service (October 2011) –** The communication of the Dial and Ride service was released during the 2011 edition of the CIVITAS FORUM, with an official demonstration targeting the local government and other politicians who attended the FORUM. Meanwhile, residents in Santa Luzia received some

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information brochures and fridge magnets about the new service (to display on the fridge) at their homes with the telephone number required for booking. The service started one week after the CIVITAS FORUM, namely on the 26th of October 2011.

**Stage 6 – Second phase of Dial and Ride service (June 2012)** – The Dial and Ride service was extended to a new steep street in Santa Luzia. Before January 2011, this street was served by regular public transport with a medium-sized bus. From January 2011 to May 2012, due to the low demand and the bad operational condition of the street, the PT operator arranged a taxi service only to link the households located along the street to the nearest PT bus stop. The PT users in this street could use a taxi for free, from their home to the nearest bus stops (located in a maximum range of 250 metres). This scheme turned out to be very expensive for the PT Operator and the solution of integrating this street in the MOBI SANTA LUZIA service was important to reduce the costs related to the taxi service.

## **B5 Inter-relationships with other measures**

The measure is related to other measures as follows:

- **FUN 1.1. Sustainable Fleet** – The buses used for Dial&Ride service were purchased under measure 1.1. It was expected that the number of passengers would be quite low so Horários do Funchal purchased buses with a low capacity. Because they are mini-sized buses, circulation in very narrow and steep streets is allowed.

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## C Impact Evaluation Findings

### C1 Measurement methodology

#### C1.1 Impacts and Indicators

The evaluation tasks for the measure of Control System for Dial and Ride Service will grant efforts on accessing a wide range of impacts, as it is shown below, covering the five big areas MAESTRO assess and granting information on how to collect information, who collects it and when. The indicators below are indicators individually selected for the assessment of this measure.

**Table C1.1.1: Specific impact indicators related with Control System for Dial and Ride Service**

Evaluation category	Evaluation sub-category	Impact	Indicator	Description and Source of data	Success quantification	Baseline	After Data collection
Economy	Revenues	Operating revenues	1 - Operating revenues	<b>Data unit:</b> €, quantitative, measurements, survey <b>Source:</b> PT Operator	Demonstrate added value of Dial&Ride when compared to the standard system and to the service dedicated to mobility impaired users.		September 2011 – May 2012
	Costs	Operating costs	2 - Operating costs	<b>Data unit:</b> €, quantitative, measurements. <b>Source:</b> PT Operator			September 2011 – May 2012
Energy	Energy Consumption	Fuel consumption	3 - Fuel consumption	<b>Data unit:</b> L/(passenger x km), quantitative, collected, derived <b>Source:</b> PT Operator	Demonstrate that Dial&Ride is more efficient with regards to fuel consumption than both the standard system and the service dedicated to mobility impaired people.		September 2011 – May 2012
Environment	Pollution/ Nuisance	Emissions	4 - NO2 emission	<b>Data unit:</b> g/(passenger x km), quantitative, estimated from COPERT. <b>Source:</b> PT operator and data about buses was provided by a subcontracting company (AREAM)	Final goal: reduce NO2, CO2 and PM10 levels by 8%, at least per km and per passenger transported, when compared to the standard service and to the service dedicated to mobility impaired users.		September 2011 – May 2012
			5- CO2 emission				
			6 - PM10 emission				

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Evaluation category	Evaluation sub-category	Impact	Indicator	Description and Source of data	Success quantification	Baseline	After Data collection
Transport	Quality of Service	Quality of service	<b>7</b> - Perception of PT quality of service	<b>Data unit:</b> Index, collected, survey <b>Source:</b> PT Operator	Improve PT quality of service in 5%, at least		March 2012
	Transport System	PT demand	<b>8</b> - Global number of PT users in target area	<b>Data unit:</b> No., quantitative <b>Source:</b> PT operator	At least 12.000 PT users per year		September 2011 – May 2012
		Network coverage	<b>9</b> – Area covered by PT service	<b>Data unit:</b> km2, quantitative, <b>Source:</b> PT operator	Increase the area coverage by PT service (+ 5% population area served)		September 2011
Society	Accessibility	Elderly inclusion	<b>10</b> - Number of elderly people in Santa Luzia in the target area	<b>Data unit:</b> No., quantitative, survey <b>Source:</b> PT Operator	At least 50 elderly people should start using PT to get to the city centre		March 2012

Detailed description of the indicator methodologies:

**1 - Operating revenues:** This indicator is intended to show the expected economical sustainability of the measure. This indicator results from a survey of all the new service users, where the customers were asked if they used the public transport before the implementation of the new service, and their usual public transport ticket before and after the implementation of the service. The analyses with these questions are better described in the section C2 Measure results. **This indicator corresponds to the specific objective 3.**

**2 - Operating costs:** This indicator is intended to show the expected economical sustainability of the measure. This indicator is the sum of the fuel costs and the wage of one driver specifically assigned to this service. The fuel costs result from multiplying the fuel consumption (indicator 4) per the average fuel cost during the period considered. **This indicator corresponds to the specific objective 3.**

**3 - Fuel consumption:** This indicator was collected by the PT operator maintenance department. This indicator results from multiplying the number of kilometres travelled by the bus line related with this service per the average fuel consumption per kilometre during the period considered. **This indicator corresponds to the specific objective 3.**

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**4 - NO2, 5 – CO2 and 6 - PM10 emission levels per km per passenger transported in PT:** These indicators were calculated with the support of the subcontractor AREAM (a private consultancy company which handled environment and energy assessment, subcontracted in the frame of measure FUN 1.1) and the use of the COPERT, considering the fleet characteristics and the fuel consumption. **This indicator corresponds to the specific objective 3.**

**7 - Perception of PT quality of service:** This indicator results from answers regarding global quality of Mobi Santa Luzia service and regarding public transport (“How satisfied are you with MOBI Santa Luzia service?”, “How satisfied are you with Local Public Transport?” in a 1 to 10 scale, being 1 very unsatisfied and 10 very satisfied) to a sample of 14 people who subscribed to this service (all the people enrolled were involved by telephone, but only 14 provided answers). The survey was conducted by telephone, to those who subscribed to this service. **This indicator corresponds to the specific objective 3.**

**8 - Global number of PT users in target area:** This indicator corresponds to the number of PT users in the bus line related with this measure, and the data is collected by the PT drivers which register the number of people actually boarding the bus after each journey. **This indicator corresponds to the specific objective 1.**

**9 – Area covered by PT service:** This indicator corresponds to the area coverage by PT bus stops considering circles with 100 meters of radius, before and after the new service. **This indicator corresponds to the specific objective 2.**

**10 - Number of elderly people in Santa Luzia, the target area:** This indicator is the result of a survey to a sample of 14 people who subscribed to the new service, where the customers were asked if they used the public transport before the implementation of the new service and about their age. **This indicator corresponds to the specific objective 2.**

***List of potential effects that were not measured***

Funchal considers very important to think and discuss all possible effects a measure can have. At this stage, an impact brainstorming, coupling all agents related with the implementation of the measures was made, which resulted in the list presented below:

**Table C1.1.2: List of potential effects that were not accessed**

<b>Impacts category</b>	<b>Effect</b>	<b>How does it impact</b>	<b>Why it was not accessed</b>
Economy	Investment costs		The main investment cost of this measure is the purchasing of a new mini bus, which is included in measure 1.1.

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Transport	Modal split of the target group	Decrease related emissions.	This was seen as a too expensive study within measure.
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### **C1.2 Establishing a Baseline**

This measure has sought to introduce public transport in an area where no service has been provided before, so the baseline is not applicable.

### **C1.3 Building the Business-as-Usual scenario**

As explained in C1.2, this is a new service so the BAU is not applicable. Also one has considered using a control site with the same characteristics without applying the Dial&Ride measure to it. However, no suitable site was encountered in Funchal.



## C2 Measure results

The results are presented under sub headings corresponding to the areas used for indicators – economy, energy, environment, society and transport.

### C2.1 Economy

#### 1 - Operating revenues and 2 - Operating costs

The costs correspond to the average fuel cost multiplied per kilometres travelled and the wage of one driver specifically assigned to this service. The operating revenues, on the other hand, result from the sum of revenues from the users of pre-paid ticket and the users of monthly pass. For the users of pre-paid tickets, one has multiplied the percentage of people who stressed that they use pre-paid tickets, per the total number of users and per the price of a pre-paid ticket. For the users of monthly pass, the percentage of people who said that use monthly pass, per the total number of users and per the average price of a travel (of those who use monthly pass) was multiplied by the partial cost of a monthly ticket.

To analyse whether the Dial&Ride service is cost-worthy, it is important to compare it with the urban regular service. Yet, data was only available for the year 2011. Hereafter, the result (revenues – costs) is compared between the two types of services, using the results per passengers multiplied per the average kilometres travelled.

**Table C2.1.1: Operating revenues and operating costs**

<b>Total revenues - costs (€)</b>		
	<b>MOBI SANTA LUZIA (October 2011 – May 2012)</b>	<b>Urban regular service (2011)</b>
Revenues HF	629	
Costs HF	14.277	
<b>Revenues - costs</b>	<b>-13.648</b>	
<b>Revenues - costs / (passengers x average km per passenger<sup>2</sup>)</b>	<b>-8,428</b>	<b>0,006</b>

The comparative cost-efficiency study carried shows that MOBI SANTA LUZIA is overly less effective than the urban regular service. So the objective of providing with the Dial&Ride scheme a better service with fewer resources failed to be accomplished.

Dial&Ride has become ineffective, increasing unit costs of the PT Operator, therefore a recent network streamline is expected to increase the number of passengers and thus help to overcome the operational costs.

A possible explanation for the results might rely on the low average ridership of the Dial&Ride. This happens in particular because of the rule of one passenger (i.e. one

<sup>2</sup> The average km per passenger of the Urban regular service is picked up from the data used by the Exploitation department of the PT Operator. The average km per passenger for Mobi Santa Luzia considered was 1,17Km and resulted from the overall km performed in a trip of Mobi Santa Luzia divided by two.

passenger and the trip takes place) which affects the overall results. In fact, if there is at least one passenger, the trip is due to start and thus the service is often delivered with only one passenger. In other words, the regulation that supports the service deployment entails specific key factors that do not allow for the service to be, if not profitable, at least, exempt from costs.

## C2.2 Energy

### 3 - Fuel consumption

Fuel consumption is a cornerstone for all the PT Operators. It works as a barometer to analyse cost-effective measures and will therefore be used to compare MOBI SANTA LUZIA to the urban regular service of Funchal.

**Table C2.2.1: Fuel consumption (October 2011 – May 2012)**

Fuel consumption		
	MOBI SANTA LUZIA (October 2011 – May 2012)	Urban regular service (2011)
Total fuel consumption (L)	602	
<b>Fuel consumption / (passengers x average km per passenger) (L)</b>	<b>0,37</b>	<b>0,03</b>

Although MOBI SANTA LUZIA is provided with a mini bus, the fuel consumption per passenger km is higher than in the urban regular service, as a consequence of the low demand of this service (average of 1,5 passengers per trip).

MOBI SANTA LUZIA was developed as a strategy to improve energy conservation and emission reduction benefits. These results show that the pre-conditions of the service need to be redesigned in order for the service to be kept running.

## C2.3 Environment

### 4 - NO2, 5 – CO2 and 6 - PM10 emission

Dial&Ride was designed to be an important component of smart growth of the PT network, which refers to policies designed to create more resource efficient patterns. To enhance the catchment area environmental quality, a place where car ownership is higher than everywhere else in the Region, the PT Operator developed a tailored solution to an area where the demand is expected to be low, but characterized by citizens who would not have another choice to travel to the city centre.

**Table C2.3.1: Emissions**

Total emissions (g)		
	MOBI SANTA LUZIA (October 2011 – May 2012)	Urban regular service (2011)
CO2 emissions	1.647.421	
<b>CO2 emissions / (passengers x</b>	<b>1.017</b>	<b>95</b>

<b>average km per passenger)</b>		
PM10 emissions	278	
<b>PM10 emissions / (passengers x average km per passenger)</b>	<b>0,17</b>	<b>0,05</b>
NOx emissions	6.818	
<b>NOx emissions / (passengers x average km per passenger)</b>	<b>4</b>	<b>0,99</b>

The overall service of Horários do Funchal is characterized by a wide range of different buses, including some pre-euro. New buses comply with more strict environmental regulations so one would expect that the results would favour the MOBI SANTA LUZIA service which is deployed by a Euro V mini (and therefore less pollutant) bus.

The mere deployment of an environmental friendly bus was not enough to demonstrate the added value of Dial&Ride in terms of emission savings. One can argue that this area is steep and so the results calculated by COPERT are influenced by the network characteristics. But arguably this assumption is not strong enough to explain the negative outcome of this measure, especially where CO2 emissions is concerned (MOBI SANTA LUZIA emits nearly 10 times more per passenger and average km travelled by the passenger than the regular PT service). The only result which does not embarrass the new innovative service so much is with PM10, where MOBI SANTA LUZIA is responsible for emitting barely 3 times more.

Noteworthy that one was not able to found in the survey to rank citizen’s perception of PT quality of service (described further bellow) any citizen that used to take the car and now use the bus. Hence the measure failed to contribute to a modal shift among the locals. This equals to say that all the emissions exhausted by MOBI SANTA LUZIA mini-bus will impact negatively and consequently there aren’t any emission savings.

Again one should outline that it may be necessary to update the study with new data sorting out of the network streamline launched on June 1st, 2012. In this rearrangement of the service, there were no changes in the rule of 1 passenger, but the service was extended to a new route and so it can be found more appealing to a wider audience.

## C2.4 Transport

### 7 - Perception of PT quality of service

A continuous measurement of service quality helps public transport to achieve the desired performance standards. The methodology of focusing the service quality results on the target area ought to be effective to access the impact the measure had on its final user, the client.

The sample is composed as described in the next table and comprises a response rate of 41% (a total of 34 citizens were enrolled in the service by March 2012):

**Table C2.4.1: Mobility habits of Mobi Santa Luzia subscribers**

	<b>Subscribers to MOBI SANTA LUZIA</b>		
	<b>Use other bus lines</b>	<b>Don't use other bus lines</b>	<b>Total</b>
<b>Total interviews</b>	<b>7</b>	<b>7</b>	<b>14</b>
Users of Mobi Santa Luzia Service	7	6	13
Non user of Mobi Santa Luzia Service	0	1	1

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New clients (that walk before the implementation of this service, and use PT tickets)	0	3	3
Clients that use PT tickets	3	2	5
Clients that use PT monthly pass	4	1	5

The users (13 people) stated a satisfaction rate of 9,25 with the Mobi Santa Luzia. The users of other bus lines (7 people) stated a satisfaction rate of 9,29 with the local public transport, but the satisfaction with this new service is a little bit higher (9,86). The satisfaction with the local public transport (for the users of other bus lines) can be roughly understood as a business-as-usual to compare with this new service. So the results are positive in that sense that the satisfaction rate with the MOBI SANTA LUZIA is slightly higher than the regular PT service. Nonetheless, one has to bear in mind that the sample size is quite small and therefore results have to be taken cautiously.

One can guess that the mere existence of a service which runs with an average of 1,5 passengers can contribute to this high satisfaction level, because passengers can feel that they have a big taxi service at their disposal for a PT service fee. But of course this apparent advantage must be counterbalanced by the logistical requirement of booking a trip in advance (and therefore to plan the everyday life in advance). This issue has arisen during the telephone interviews when a citizen has proved to be unhappy with the need to make a call so as to use this service.

A methodological remark has to be mentioned. The survey has included one citizen that, despite being enrolled in the service, has not use it. Basically, this happens because this citizen might be planning to book a trip in the future and for that to happen needs to be already enrolled in advance.

It is also important to say that all of the users said that they had already recommended this service to others in the neighbourhood. If they did that and the service has not been able to gather more passengers than it has, one can assume that there are no more potential users in the area and that therefore the service has reached its maximum ridership number as it was in the first phase of implementation. Within this framework, the second phase of the measure has come at the right moment to give a boost to the measure.

**8 - Global number of PT users in the target area**

Between the implementation of this service and May 2012, a total of 1.384 passengers were registered. This correspond to an average of 1,5 passengers per trip. None of the subscribers of this service use wheelchair so the objective of improving accessibility and social inclusion in the catchment area is jeopardized and the success quantification outlined in the specific impact indicators table (Table C1.1.) failed to be accomplished.

**9 – Area covered by PT service**

The Dial and Ride service was implemented in an area of 230 km<sup>2</sup>, of those 108 km<sup>2</sup> (47%) were not covered by public transport before MIMOSA (considering a buffer of 100 m<sup>2</sup> around bus stops). After the implementation, only 38 km<sup>2</sup> (17%) of the area was still not covered by public transport. So, the measure was able to increase in about 30% the area covered by public transport services.

**C2.5 Society**

**10 - Number of elderly people in Santa Luzia in the target area**

The survey conducted to a sample of MOBI SANTA LUZIA users has demonstrated that none of the new users are elderly people (the three new users are 46, 60 and 63 years old).

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Among the other users which already use to ride the service, five of them (38% of the total people) are older than 65 years..

Contrasting these results with the feasibility survey conducted before the measure has started, one can realize that the results are fixed well below the expected public target. In the ex-ante survey to understand the potential users of Dial and Ride service, 52% of the citizens living in the target area and that have stated to be interesting in using Dial&Ride were elderly people. This shows that the target public is more reluctant to shift the share towards PT than expected. Clearly there was not a communication barrier because all the residents should be aware that the new service was deployed so additional research need to be carried out to understand what prevents them taking the bus more often.

Nonetheless, MOBI SANTA LUZIA was implemented in an area where the ratio of people who own a private car is higher, and also where the citizens are more elderly than on average. This means that they will need, sooner or later, a public transport solution that can go door-to-door. These characteristics are what makes this area unique and unveils the innovative capital of providing a Dial and Ride service to an urban area, definitely a long-forward policy for this area.

**C2.6 Cost-benefit Analysis**

Unlike previous expectations, CBA was not conducted because the number of users and the revenues was fairly low, so benefits would be quite difficult to access. As a result, cost-benefit analysis proved to be not possible to carry out.

**C3 Achievement of quantifiable targets and objectives**

No.	Target	Rating
1	Demonstrate added value of Dial&Ride when compared to the standard system and to the service dedicated to mobility impaired users.	O
2	Demonstrate that Dial&Ride is more efficient with regards to fuel consumption than either the standard system or the service dedicated to mobility impaired people.	O (comparison to mobility impaired people was not assessed)
3	Reduce NO2, CO2 and PM10 levels by 8%, at least per km and per passenger transported, when compared to the standard service and to the service dedicated to mobility impaired users.	O
4	At least 50 elderly people must start using PT to get to the city centre.	O
5	Improve PT quality of service in 5%, at least.	□
6	At least 12.000 PT users per year.	O
7	Increase the area coverage by PT service (+ 5% population served)	□□□
<b>NA = Not Assessed    O = Not Achieved    □ = Substantially achieved (at least 50%)</b> <b>□□ = Achieved in full                      □□□ = Exceeded</b>		

The table above summarizes the effects this measure registered. A Dial&Ride scheme seldom could have impacted so positively after such a short implementation period. But the targeted indicators have proven that even though there are direct impact results on increased

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mobility provided by a new PT service, the introduction of these improvements impacted negatively on average. This is because the service was not able to cause a modal shift from the private vehicle to the PT and because often the bus operated with only one passenger (average number of passengers was of 1,5 per trip). These combined characteristics have led to increase pollutant emissions in the area.

Finally, the service has not created significant mobility breakthroughs in terms of mobility benefits. As the area covered by PT increases, the number of users, especially the elderly and more deprived did not accompany this increased accessibility levels. Nonetheless, people in the area have now more mobility options which can lead to increased quality of life for residents (as was the high level objective of this measure). This idea has some adherence in the high share of people who find Mobi Santa Luzia as having a higher quality of service than regular PT schemes.

## **C4 Up-scaling of results**

During the relevant event in which CIVITAS-MIMOSA was promoted, Expo Madeira, both in July 2010 and in 2011, people were asked, if they felt Dial and Ride as useful for themselves (see B2-RTD) Not only the target citizens living in the parish of Santa Luzia were inquired. The survey was open for those who either live or not in Funchal, showing good results in terms of acceptance about this service. However, people were only asked if they live in or outside Funchal, so more analysis is needed for HF to plan a service extension to other areas in Funchal and beyond in detail.

Considering that the evaluation of the second phase of Dial and Ride in Santa Luzia is ongoing<sup>3</sup>, Horários do Funchal already registered a slight increase number of passengers (the first phase had an average of 55 passengers per week and the second phase is registering an average of 77 passengers per week).

## **C5 Appraisal of evaluation approach**

Horários do Funchal only analyzed the period between the launch of the implementation and May 2012. The second implementation phase (the extension of the service to another route formerly covered by a taxi service paid by the PT Operator itself), which began on June, 2012, was not evaluated due to the lack of time to collect accurate data about this new phase within MIMOSA.

The Dial and Ride service in Santa Luzia is compared to the regular urban service, but the periods in comparison are different. The regular urban service had a positive result in 2011, but does not mean that it would be positive as well during the period where the MOBI SANTA LUZIA was in operation. Since no data was available for the same periods, one has decided to use slightly different timelines for cross-evaluation even though it can lead to some misunderstandings.

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It started almost at the very end of MIMOSA and close to a summer break, so no data was collected for the measure result template.

During the preparation of the evaluation plan, it was planned to use a control site with a similar area in Funchal. But Funchal is very heterogeneous and so this kind of approach proves to be unsuitable.

Although more research is needed to better quantify the distribution of impacts, it is likely that most positive outcomes are directly perceived by users (at least they ranked MOBI SANTA LUZIA with a slightly higher satisfaction level than the regular PT service), so total benefits might be greater than what was measured in this measure result template.

## **C6 Summary of evaluation results**

The key results are as follows:

- **Financial net balance of MOBI SANTA LUZIA is on the verge of unsustainability** – unlike the urban regular service which has shown to be offering adequate service against the demand, MOBI SANTA LUZIA has registered to be over-dimensioned for the actual demand. This is the reason why the service was recently subject to an extension in order to target a broader number of passengers.
- **Fuel consumption in MOBI SANTA LUZIA is 10 times higher than in urban regular service** – owing to the general framework of the measure, which was not able to convince locals to use the bus more often and leave the car parked at home, the service was often deployed with only one passenger, underpinning the fuel efficiency related with the service.
- **High increase in pollutants emission levels** – Due to the low demand, the level of emissions per passenger transported has imposed heavily and contributed to a negative outcome at this level. MOBI SANTA LUZIA emitted 10 times more CO<sub>2</sub>, nearly 3 times more PM10 and 4 times more NO<sub>x</sub> than the regular PT service.
- **High satisfaction rate with MOBI SANTA LUZIA** – Satisfaction almost reached an average of 10 in a 1 to 10 scale (being 10 an excellent service). It is of course worth mentioning that the sample size is rather small. It is also important to empathize that the satisfaction with the general PT service was very positively perceived, but not as much as MOBI SANTA LUZIA.
- **Low number of PT users** – A total of 1.384 passengers travelled in MOBI SANTA LUZIA between late October 2011 and May 2012. An average of 1,5 passengers/per trip were registered. A low demand was something that was already envisaged in the beginning, but having so few passengers harms the sustainability of the measure in the future and this is the reason why the measure has been recently extended. Noteworthy that the measure has failed in the task of convincing elderly people to use public transport (none of the new PT users are over 64 years old).
- **Accessibility has increased in about 30%** – This calculation results from the area now covered by PT service. Without CIVITAS, there would be a gap in the parish of Santa Luzia which could lead to disruptive territorial inclusion. This result can have multiplier effects in terms of social inclusion not calculated within this evaluation framework (such as the opportunity to elderly and with reduced mobility people to go to the city centre where the main interesting points are located like markets and shops).

## **C7 Future activities relating to the measure**

Following the less positive conclusions that the impact evaluation has come across with, but having increased the mobility of the people living in the target area, a set of actions has been designed which can turn around things and make this service more suitable and sustainable in the long-run.

Hence, as future activities, Horários do Funchal will study the possibility to expand this service even more to areas in the surroundings of Santa Luzia with PT service where demand is also low and so the same bus deployed in MOBI SANTA LUZIA can pick passengers up in a broader area.

Other alternatives to make this service more sustainable will be studied, such as the deployment of even less energy-intensity vehicles (like hybrid cars) for MOBI SANTA LUZIA.

If the bus driver is assigned to other tasks between the single trips instead of waiting for the next trip, would also contribute to diminish the costs associated and make the service more flexible. This change requires logistic-wise measurements in the operations department of the PT Operator.

A fourth idea comprises to make a direct competition with taxis that wait for tourists who go downhill with the traditional wooden baskets. The MOBI SANTA LUZIA would rather be parked in this strategic area instead of in the city centre to convince tourists to go to the city centre by bus rather than by taxi. The bus could even be decorated specifically to this new feature of the service to make it more attractive for tourists.

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## D Process Evaluation Findings

### D.0 Focused measure

Reason		
<i>The high level of innovativeness of the measure with respect to technique, consortium, process, learning etc.</i>	1	Most important reason
<i>The high degree of complexity of managing the measure</i>	2	Second most important reason
<i>The measure fits into the EU policy towards clean urban transport (five pillars of the EU Green Paper)</i>	3	Third most important reason

### D.1 Deviations from the original plan

The deviations from the original plan comprised:

- Control centre architecture** – Within this measure HF analyzed the possibility to purchase software for the dispatch centre or to make a subcontract to develop and implement a system to control fleet management and a call centre, with a total cost of 70.000 € (EC funding 35.000 €). Considering that the commercial software available on the market do not entail all the characteristics HF needed for the deployment and management of a Dial&Ride service (namely, users' requests& confirmations; the planning of the service itself, including schedules and routes; and lastly, the production of reports), the PT Operator has decided to steer this measure towards a straightforward solution. The delays also had a strong effect on the budget, in the sense that the eligible cost of the software and the equipments will be lower and the expenses of the project for the PT Operator will consequently be higher. As a result, the decision was to organize a simpler dispatch centre assigned to coordinate the service according to the booking as it is for the mobility-impaired service. The impact of this deviation might however be positive because data collected during the R&D phase showed that the target area population is getting older and older. This target group may deal with some difficulties when facing a non-conventional PT supply which urge users to book online. In fact, communication and information skills are not equally distributed among the population. It is usual more spread among the youngest generations, and this seem to be the group with less weight among the passengers.

- Measure downsized** – Due to the technological difficulties stressed before which delayed the measure, the steering team has down-sized the measure scope, implementing it in a small pilot area. As a result of this change, the measure results were accordingly redefined in the measure description of action as they are in C3.

### D.2 Barriers and drivers

#### D.2.1 Barriers

##### Overall barriers

- **Lack of electronic expertise** (10 – *Technological*) – The planned Dial&Ride service requires many technological and informatics standards, which were not so well-developed through local partners because Madeira is an outermost island without much know-how on the technological requirements for Dial and Ride measure.
- **Lack of interrelationship between communication teams** (8 – *Organizational*) – During the Learning Histories Workshop, all of those who have, at some point, contributed to the measure development have come together to meet and learn from each other. In these meetings it was made clear that there is a lack of integration between different communication areas (the communication department of HF, the communication department of the Municipality, the subcontractor to handle communication in MIMOSA for Funchal, the communication and dissemination leader of Funchal didn't know with detail each other's role in the communication process). Measures deployed in the framework of cooperative projects urge for liaison between communication and dissemination experts. The partners are asked to enforce each other's role in the project, so if they had known about it, a common communication plan could have been prepared. To lose all this potential is a pity.

### **Preparation phase**

- **Increase patronage to use taxis instead of buses** (1 – *Political/Strategic*) – The initial political support was somewhat unclear. This was shown when the Municipality of Funchal committed to sign a protocol with a taxi association in 2009. This protocol aimed to grant taxi discounts for Santa Luzia residents, assuming that they live upon an area with a fairly difficult access. Instead of underpinning a public transport measure, the municipality undertook an action that clearly diverges from the CIVITAS MIMOSA strategy, since its focus lies in the same territory and target group.
- **Procedures of the PT Operator menaced a participative decision-making process** (2 – *Institutional*) – The Exploitation department has drafted some of the service characteristics without sharing them first and discussing it with the project management team. To sum it up, there has been some lack of integration in the working routines between the Exploitation area and the project management team. The lack of integration has been made evident because a number of studies were carried out during the R&D phase. These studies were instrumental to fully understand and characterize the technical requirements of the measure and the target population. The Exploitation department sometimes did not attend to the recommendations and remarks that the study areas has proposed with regard to the Dial&Ride service schedule and other features of the service design.

### **Implementation phase**

- **Portuguese financial bail-out** (9 – *Financial*) – Since June 2011 Portugal has been managed by TROIKA (joint EC/ECB/IMF) which have an extensive

programme of actions to restructure the public organizations debt. In respect to these financial difficulties which harmed the measure, it was first decided to limit the pilot test of this measure to a smaller catchment area and then, when facing a very low demand, to expand the service to a new route so as to catch more users and stop providing an inefficient taxi service.

## D.2.2 Drivers

### Overall Drivers

- **Know-how on managing demand-responsive services (6 – Positional)** – Horários do Funchal, the urban public transport operator, provides, since 2005, a special service dedicated to disabled people. So the PT Operator has 5 years of experience in organising (booking, checking viability, scheduling and supplying) public transport service defined case by case. This is important in order to deepen and widen the existing service.

## D.2.3 Activities

### Overall activities

- **Increased focus on learning from the processes that delayed the measure (7 – Planning)** – The main aftermath of the overall barriers stressed before is that this measure has had a short implementation period during MIMOSA lifetime. Therefore, an increased focus was given to the project evaluation on the process side.
- **Performance of a Learning History Workshop with a wide range of participants (5 – Involvement, communication)** – This measure has benefited from the Learning Histories Workshop with more participants in order to react on the communication barriers encountered. It proved to be very helpful to increase communication and motivation among stakeholders. The decision of involving different areas of knowledge and different partners was successful not only to build new perspectives and find ways for fresh strategies that are able to improve the process of the measures, but also to recover from the delays that this measure was facing and to commit the partners to follow the measure schedule with more attention and respect regarding to deadlines and milestones.

### Preparation phase

- **Involvement of external institutions (5 – Involvement, communication)** – the implementation of a dial and ride service in an urban area required the involvement of other institutions which have specific know-how to support the implementation phase of the measure, namely the lack of expertise with regard to the electronic support systems that were due to support the dispatch centre. Contacts with universities from abroad were undertaken but no feasible solutions were found.

- **Citizens engagement on the service design** (5 – *Involvement, communication*) – Horários do Funchal undertook a bottom-up planning approach intended to collect and analyse valuable feedback to design the Dial&Ride service. The target citizens were involved in this measure from the very beginning. Horários do Funchal has carried out a participative process during the month of April to empower citizens to participate in the decision-making process with regard to the service being provided.

#### **Implementation phase**

- **Measure reshaped to meet financial and operational constraints** (9 – *Financial*) – Participants of the Workshop were consensual that one of the main and strategic actions implemented during this reporting period lies in the restructure of the measure scope following the delays that have occurred. So the local team took actions to emulate the system already in motion for the disability citizens with success. This seemed to be a good and efficient option as the service is dedicated to a restricted number of users (so it does not overwhelm the persons who work at the dispatch centre). Plus, developing a pilot in a smaller area has been important to limit the costs of this measure, making it more economically sustainable and still meaningful for those who benefit from it.

#### **Operation phase**

- **Dial&Ride launched was at the spotlight of the CIVITAS FORUM 2011** (6 – *Positional*) – This way the project has become visible to a wide audience of policy-makers and journalists. The project turned out to be also important for the Regional politicians who attended the official demonstrating activities and highlighted the project's main benefits for the regional development and social inclusion.

### **D.3 Participation**

#### **D.3.1. Measure Partners**

- **Horários do Funchal** - is the measure leader responsible and was responsible for the implementation of Dial and Ride service.
- **Municipality of Funchal** - supported the deployment of this measure by supporting the communication campaigns, aiding and implementing new bus stops in the target area.

#### **D.3.2 Stakeholders**

- **Regional Government** - they supported the measure by sponsoring the 2011 edition of the CIVITAS FORUM held in Funchal.

- **Lower municipal authorities (at parish level)** – were involved during the communication campaign because they are the actors who know best the people living in the catchment area.
- **AREAM** – is an energy and environment agency based on Madeira that carried out a fleet renewal strategy in the frame of CIVITAS Sustainable Fleet measure. Their inputs were essential to calculate emission from the busses using the COPERT software.

## D.4 Recommendations

### D.4.1 Recommendations: measure replication

- **Study the demographic and social conditions in advance** – Before the implementation of a Dial and Ride service it is important to study the demographic and social conditions of the target group. It is recommended to make a survey to collect data about the age, use of wheelchair, mode of transport, number of trips. This could help to better define the service conditions. But follow-up cities must bear in mind that positive feelings about the service do not always correspond to high adherence when the service is implemented. Experience has shown that people tend to try to increase the public transport supply by stressing that it would be useful even not having intention or being willing to use it in the short-term.
- **Build upon already existent building-blocks** - This measure fits well in the strategy of optimizing resources and deploying public service where citizens need it most. Moreover, it is perfectly aligned with the results that came out of the fleet renewal study. The orientation of the fleet renewal study, which aims at increasing the mini and midi fleet of the PT is an additional plus of the measure. Potential take up cities should not reinvent the wheel, but rather align the idea of developing Dial&Ride services with the running strategies (local, national).
- **Booking system architecture has to suit well the target audience** – The booking system provided by telephone and not by Internet as initially pursued might have been a driver because the target-public is old and probably Web low-skilled. But if follow-up cities are interested in implementing a similar measure into an area where young population imposes, it might be adequate to provide an electronic interface to book trips. On the other hand, the booking of trips by telephone can be seen as a problem for occasional and systematic users. So a mix solution should be found.

### D.4.2 Recommendations: process

- **Bottom-up approach is advocated** – The methodology pursued to implement this measure was to discuss with people in a participatory process to help defining the service design. Follow-up cities should emulate this approach because Dial&Ride experience has proved that by engaging citizens from almost the very beginning, the measure has been widely anticipated by the locals. The process established within this measure is therefore a legacy with regard to public participation in service design.