

Measure title: **Bus Traveller Information**

City: **Donostia–San Sebastián** *Project:* **ARCHIMEDES** *Measure number:* **73**

Executive Summary

Within this measure, a more efficient information system is put in operation in order to provide current and potential public transport users with the ability to better plan their trips and optimise their travel times, mostly by reducing waiting times at stops and favouring a reliable connection with other routes and services.

Before the CIVITAS project CTSS-DBUS offered a rather good information system to travellers, including information panels at a limited number of bus stops, but there were opportunities to improve the quality of access to bus information for all people and especially for impaired people. Also the evolution in telecommunication technologies provided the opportunity to design new interactive services.

Therefore, a new travel information system was implemented, providing real time information such as arriving bus line, waiting times, connections, eventual incidents in the service, through the following means:

- Real time information system on-board announcing next stop and connections
- Provision of bus arrival times by SMS messages.
- Provision of bus arrival times via Bluetooth.
- Electronic information panels at bus stops providing information on arriving busses, waiting times and eventual disruptions or re-directions of the services.
- Renewed web site including real time information at bus stop level and a route planner.

The onboard and web information systems have been adapted to visually impaired people.

The traveller information system has been very successful, with more than 3.500 daily requests for real time information via SMS or the website. The provided information is highly reliable, with 98,1% of all the information requests assessed as correctly answered by the users. When assessing these figures, it should be born in mind that 60.000 users have access to real time information at the bus stops through electronic boards.

As for the importance that public transport users place over information issues, a survey was carried out among CTSS users. Results revealed that information issues are perceived as very important, with an average score of 8,47 out of 10. User demand for quality information services is therefore very high. Complementing this figure, a user's satisfaction survey revealed a very high acceptance level (average of 7,55) regarding information provision in CTSS' service. This figure is almost identical to the one achieved in the reference year (2006). The fact that high satisfaction levels are maintained is a very remarkable result, bearing in mind that users' expectations were also very high, as revealed in the public perception survey.

A Introduction

A1 Objectives and target groups

A1.1 Objectives

The measure objectives are:

(A) High level / longer term:

Within the CIVITAS-ARCHIMEDES project in Donostia–San Sebastian, the main objective is to increase all dimensions of quality of public transport in the city.

(B) Strategic level:

This measure aims to offer the citizen a more attractive public transport system by introducing useful travel information in real time. The expected results of implementing the measure in the CIVITAS corridor are:

- increased reliability of travel time;
- higher frequency of service on the corridors;
- increased quality of service (based on UNE EN-13816 quality standards)

which in combination with other CIVITAS measures, will result in an increase of 1.000.000 passengers by the end of the CIVITAS project.

(C) Measure level:

The information will be specially adapted so that visually impaired people can understand it. This improved information will make public transport more attractive to users and will remove some of the barriers to using public transport and encourage people to use it. The ARCHIMEDES project will also deliver a new user-focused website containing public transport information.

A1.2 Target groups

- Citizens of San Sebastian and visitors that travel by public transport along the city.
- Impaired people. On-board information specially adapted for visually impaired people.

A2 Description

This measure aims to offer the citizen a more attractive public transport system by introducing useful travel information in real time.

CTSS-DBUS has implemented a new travel information system which provides real time information such as arriving bus line, waiting times, connections, eventual incidents in the service, through the following means:

- Real time information system on-board announcing next stop and connections
- Provision of bus arrival times by SMS messages. This is an on-request service for which users are required to send a SMS message (0,15€+ VAT) to a certain number

- including the bus stop identification number. As a response, the user will receive a SMS including the waiting times for the different busses arriving to that stop
- Provision of bus arrival times via Bluetooth, providing the same information as the SMS system, but free of charge
 - Electronic information panels at bus stops providing information on arriving busses, waiting times and eventual disruptions or re-directions of the services
 - Renewed web site including real time information at bus stop level and a route planner where users can introduce their origin and destination address (street name and number are requested) and different combination of public transport routes are provided, including journey times, itinerary, required transfers, etc. In addition, an estimation of the energy saved as compared with the same route made by car is provided.

The on-board and web information systems are adapted to visually impaired people. More particularly, audio messages announcing next stop and possible transfers are provided on-board, while the web site uses a device to adapt the information provided (design, text fonts, etc.) to the visually impaired.

B Measure implementation

B1 Innovative aspects

The innovative aspects of the measure are:

- **Use of new technology/ITS, (at international level):** the installation of monitors in buses providing the passengers information related to the bus stop of destination; real time information of bus arrival via SMS (on request), at website and at bus stops by electronic devices. The measure intends to test whether real time information will lead to increased user satisfaction.
- **Targeting specific user groups (at national level)** – through technology and information developments the visually impair people is targeted.

B2 Research and Technology Development

Not relevant.

B3 Situation before CIVITAS

CTSS-DBUS offered a rather good information system to travellers, including information panels in a limited number of bus stops (50 bus stops, aprox. 10% of all bus stops), but there were opportunities to improve the quality of access to bus information for all people and especially for impaired people. Also the evolution in telecommunication technologies provided the opportunity to design new interactive services.

B4 Actual implementation of the measure

The measure has been implemented according to the following stages:

Stage 1: Preparation and design phase (Sep. 2008 – Dec. 2008)

CTSS-DBUS has identified information needs regarding public transport services and has designed a comprehensive travel information system, including real time information on-board and at bus stops.

Stage 2: Procurement and testing phase (Sep. 2008 – Feb. 2009)

CTSS-DBUS has prepared, purchased, installed, implemented, and tested a new traveller information system, including on-board real time information, real time information at bus stops, information via SMS (on request), and a dedicated website. This system also is made accessible/understandable for the visually impaired (on-board audio messages and adapted web-site).

The system was tested over a three-month period in 8 buses of one line. After the testing phase the system was gradually expanded to the whole network.

Stage 3: Demonstration phase (Feb. 2009 – Sep. 2012)

CTSS-DBUS has demonstrated and monitored a new traveller information system, including on-board real time information, real time information at bus stops, information via SMS (on

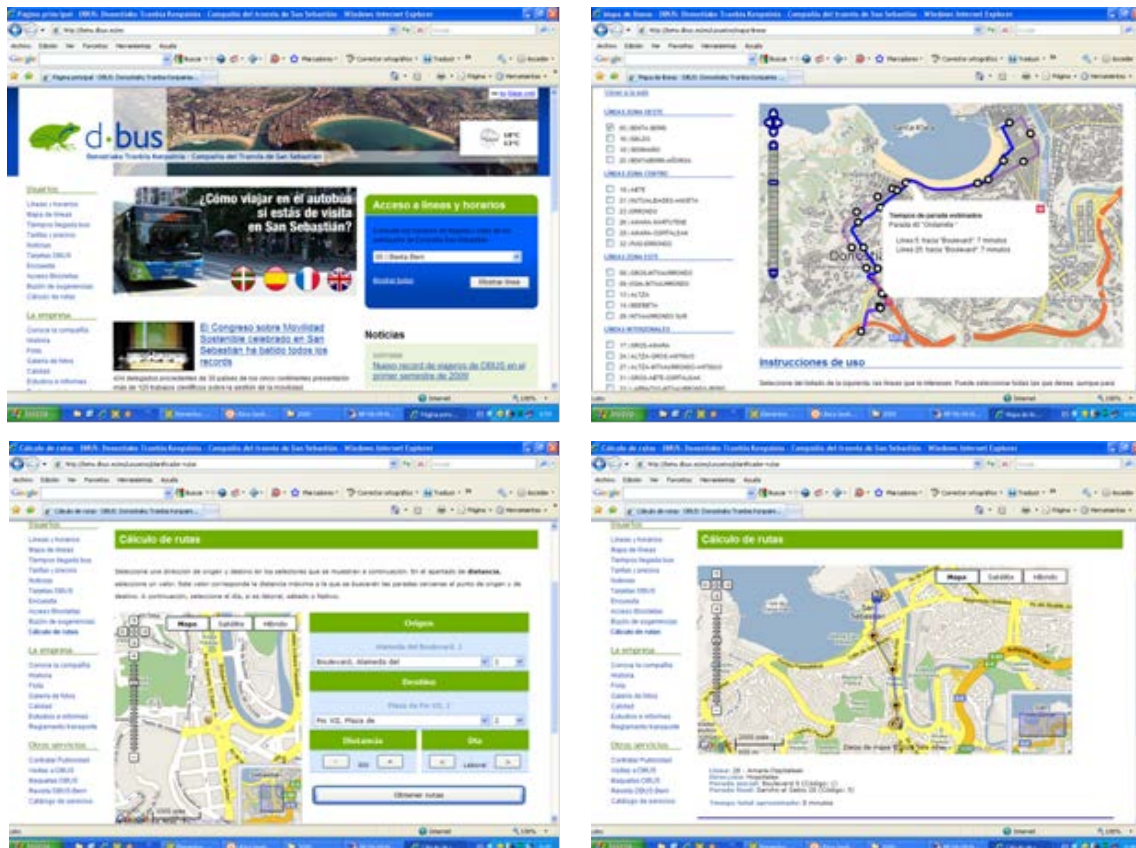
request), and a dedicated website. This system is also accessible/understandable for the visually impaired (on-board audio messages and adapted web-site).

Currently, the system is as follows:

- On board information systems over the whole vehicle fleet (120 buses)
- Electronic information boards at 88 bus stops
- SMS information service available in the whole bus stop network (509 bus stops)
- Bluetooth information system operating at 20 bus stops
- Web information system and route planner covering the whole bus service
- Mobile version of web site information (simplified)



Picture 1: On-board real time information



Picture 2: Online route planner



Picture 3: Real time information panels at bus stops



Picture 4: SMS information service

Stage 4: Evaluation (Sep. 2008 – Sep. 2012)

Impact and process evaluation is undertaken according to Measure Level Evaluation Plan guidelines.

B5 Inter-relationships with other measures

- **At the site level:** This measure is closely related to measure 74 on fleet management. The systems purchased within the two measures are integrated to be able to provide information for both travellers and fleet management.

In a global concern of making more easy for people to use the public transport system, this measure is to be put in relation with the 16 one about the settlement of High Quality Public Transport Corridors.

- **At the measure level:** this measure is directly involved in the wish, within the whole ARCHIMEDES project, to improve travel information for all passengers: measures 68, 69, 71, 72, and 78 are tightly linked. The final aim is to strengthen the services that information systems may bring to passengers.

C Planning of Impact evaluation

C1 Measurement methodology

C1.1 Impacts and indicators

C1.1.0 Scope of the impact

This measure is part of a package of measures (measures nº 16, 17, 73 and 74) aiming at increasing the quality offered by the public transport service in the municipality of Donostia-San Sebastián. The development of an optimised and user-friendly environment for public transport modes is expected to encourage citizens to make a higher use of collective transport, shifting from private cars to public transport.

In the case of this particular measure, a more efficient information system is placed in operation in order to provide current and potential public transport users with the ability to better plan their trips and optimise their travel times, mostly by reducing waiting times at stops and favouring a reliable connection with other routes and services.

This package of measures is part of an overall strategy to reduce the number of cars entering the city and circulating within its neighbourhoods, which is expected to provide benefits in the form of better air quality, less carbon emissions and reduced noise levels, resulting in a better health and quality of life for Donostia-San Sebastián citizens.

Modal shift to public transport modes will impact traffic performance, reducing congestion, allowing motorized modes to achieve better travel times, and in the case of public transport services, making it more reliable, thus contributing to increase its attractiveness to users.

Also the increase in the number of users of public transport will increase the operating revenues of the public transport company (as well as will reduce operation and maintenance costs), making it able to invest in higher quality standards for bus service operation.

Since public transport usage, traffic performance and environmental effects are already evaluated within other measures with a major contribution to these goals, the impact evaluation of this measure focuses on results directly associated to the information system.

C1.1.1 Selection of indicators

NO.	EVALUATION CATEGORY	EVALUATION SUB-CATEGORY	IMPACT	INDICATOR	DESCRIPTION	DATA /UNITS
	SOCIETY					
		Acceptance	Public perception	Public perception level (information)	Impact on public perception derived from the measure. This indicator will be used to estimate the influence of this measure on modal shift towards public transport.	Percentage, qualitative, collected survey.
	TRANSPORT					
19		Quality of Service	Quality of service	User acceptance for information services	Perception of quality of service	Index, qualitative, collected, survey
		Quality of Service	Quality of service	Number of information requests	Number of requests for real time information (web & SMS)	No, quantitative, measurement
		Quality of Service	Quality of information	Operation statistics of the real information system (web & SMS)	Reliability of the information service by web & SMS	No and %, quantitative, collected

C1.1.2 Methods for evaluation of indicators

No.	INDICATOR	TARGET VALUE	Source of data and methods	Frequency of Data Collection
	Public perception level (What is the importance of information?)		Data has been collected through a yearly on-board survey conducted among the users of public transport. The survey includes public perception levels in relation to this specific measure and public transport in general. Also, the relative weight of this measure in modal shift towards public transport was surveyed. A sample size of 1.500 users (approximately 12% of the daily passengers) of the two main lines of the public transport (5 and 28) system has been used.	Annual (after the implementation of the measure)
19	User acceptance for information services	Quality Index of 7	Data was collected through a yearly on-board survey conducted among the users of public transport (undertaken in November every year), complemented by a continuous web based survey throughout the year. The survey includes acceptance indicators in relation to this specific measure and public transport in general. This survey is part of the yearly quality of service survey conducted. A sample of 5% of the daily users of the two main lines of the public transport (5 and 28) system has been used.	Annual (before and after the implementation of the measure)
	Number of requests for real time information (web & SMS)	150.000 requests/year	The travel information system registers the number of information requests made through the web site or via SMS.	Monthly (after the implementation of the measure)
	Operation statistics of the real information system (web & SMS)	Index of 95%	The new travel information system registers the requests that have been answered correctly to the customer.	Monthly (after the implementation of the measure)

C1.1.3 Planning of before and after data collection

EVALUATION TASK	INDICATORS INVOLVED	COMPLETED BY (DATE)	RESPONSIBLE ORGANISATION AND PERSON
Survey to estimate public perception levels	-	Months 26, 38	CTSS / Javier Vallejo
User acceptance for information services	19	Month 14/26/38	CTSS – Javier Vallejo
Number of requests for real time information (web & SMS)		Month 12 onwards	CTSS – Javier Vallejo
Operation statistics of the real information system (web & SMS)		Month 12 onwards	CTSS – Javier Vallejo

C1.2 Establishing a baseline

Although CTSS-DBUS already offered a rather good information system to travellers, real time information was not provided through all the network and services. Also, there were no interactive information services such as the SMS system and the web route planner. It is therefore not possible to assess the baseline situation for the number of information requests and the operation statistics.

The baseline only includes the public acceptance level of the information provided, which results from the yearly quality of service survey conducted among the users of the public transport system, which includes an assessment of CTSS' information system. Following the UNE EN-1313816 quality standard criteria, 5% of the daily users of the service are surveyed. Taking into account the number of users of CTSS' lines 5 and 28, the following number of surveys was conducted each year:

- 2006: 630 questionnaires (in this year the quality standard criteria was not yet used)
- 2007: 350 questionnaires (approximately 5% of lines 28)
- 2008: 550 questionnaires (approximately 5% of lines 5 and 28)
- 2009: 550 questionnaires (approximately 5% of lines 5 and 28)
- 2010: 575 questionnaires (approximately 5% of lines 5 and 28)
- 2011: 575 questionnaires (approximately 5% of lines 5 and 28)

The survey is conducted yearly through the distribution of questionnaires on-board which are completed by the users during their trip. This is complemented by an ongoing web survey throughout the year. Nevertheless, results from the web survey has been omitted from the analysis due to the limited statistical significance of them (an average of 60 questionnaires per year are received through the online questionnaire) as well as for the bias encountered in its analysis (in most cases this online survey is used as a complain tool, rather than a satisfaction survey, thus not reflecting the opinion of the average traveller).

But the evolution in communication technologies and the implementation of the new bus management system allowed CTSS-DBUS to design and implement a new information system, which required the enlargement of the evaluation procedures, which now also considers the acceptance (in terms of number of uses) of the interactive information systems (SMS and web) as well as the effectiveness (accuracy of the information) of the system. The later refers to the potential situation where an information request is not followed by the corresponding data due to disfunctioning of the real time information system (communication systems may eventually suffer from disruptions and lose track of a certain line and produce a blank message when information is requested). The system itself is capable of accounting for this situation.

Like in the other CIVITAS measures regarding public transport, 2006 is used as a reference year for the evaluation.

C1.3 Method for Business as usual scenario

In order to estimate the BaU scenario for the indicator on user acceptance, the evolution of its value over the 5 years previous to the reference year (2002-2006) has been analysed. Nevertheless these figures didn't reveal any clear pattern able to be used to extrapolate the BaU case. Therefore the average of these 5 previous has been used, resulting an index of 6,7.

C2 Measure results

C2.1 Transport

Table C2.1.1: Quality of Service

Indicator	Before 2006	BaU 2010	After 2010	BaU 2011	After 2011
Public perception level (information)	NOT AVAILABLE	NA	8,30	NA	8,47
19. User acceptance for information services	7,44	6,69	7,41	6,69	7,55
Number of information requests	NOT APPLICABLE	NA	595.947 per year	NA	1.301.802 per year
Operation statistics of the real information system (web & SMS)	NOT APPLICABLE	NA	98,12% reliability	NA	98,11% reliability

Indicator	Difference: 2010 –Before	Difference: 2010 – BaU	Difference: 2011 –Before	Difference: 2011 – BaU
19. User acceptance for information services	-0,03	0,72	0,11	0,86

In order to assess the importance that public transport users place over the different dimensions of the bus service approached by CTSS within CIVITAS, a survey was carried out among 1.500 users (12% of the daily passengers) of the two most representative lines in the CIVITAS corridor (lines 5 & 28). The results reveal that information issues are perceived as very important, with an average score of 8,47 in 2011 (8,30 in 2010). User demand for quality information services is therefore very high.

Users were also asked about their acceptance level towards the actual implemented information system. This issue was included in the yearly quality of service survey conducted over a 5% of the daily users of lines 5 & 28. The survey revealed a very high acceptance level (7,55 in 2011 and 7,41 in 2010). Although a very small reduction was accounted in 2010 (insignificant in statistical terms), this figure is almost identical to the one achieved in the reference year (2006). The fact that high satisfaction levels are maintained is a very remarkable result, bearing in mind that, on the one hand, users' expectations were also very high, as revealed in the public perception survey; while, on the other hand, information services are taken for granted soon after its implementation and increased satisfaction are usually a consequence of further enhancements, whereas any particular incidence regarding information is highly appreciated by the users, making it easier to reduce satisfaction levels rather than gradually improve them.

In order to estimate the BaU scenario for this indicator, the average of the 5 years previous to the reference year (2002-2006) has been used, resulting in an index of 6,7 (there is not a clear pattern in the evolution trend of this indicator).

The traveller information system has been very successful, with more than 3.500 daily requests for real time information via SMS or the website. To highlight the high reliability index associated to information requests (98,1%), which remained stable during 2011. When assessing these figures, it should be borne in mind that in addition 60.000 users have access to real time information at the bus stops through electronic boards.

Last but not least, as stated in the Objectives section, the measure is aimed at, in combination with other CIVITAS measures, contributing to an increase of 1.000.000 passengers by the end of the CIVITAS project. In this regard it should be noted that between 2006 and 2011, there was an increase of 2,55 million extra travellers in CTSS's public transport system, which represents a 9,6% increase in the number of users. Although this increase in the number of users didn't have a significant impact in terms of modal share, with public transport substantially maintaining its patronage while a 0,4% reduction in car use is accounted as compared to the BaU situation, it should be highlighted that this achievement is made in a context of a steady increase in car travel, thus it can be considered a positive result.

C3 Achievement of quantifiable targets and objectives

No.	Target	Rating
1	Increase of 1.000.000 passengers by the end of the CIVITAS project	***
2	User acceptance for information services: 7,0	***
3	Nº of requests for real time information (web & SMS): 150.000 request/year	***
4	Accuracy of the real information system (web & SMS): 95%	***
NA = Not Assessed O = Not Achieved ★ = Substantially achieved (at least 50%) ★★ = Achieved in full ★★★ = Exceeded		

C4 Upscaling of results

Since it is already planned to implement this measure to the whole public transport service of Donostia-San Sebastian, the only way to up-scale this measure is by expanding the measure to all other transport services in Gipuzkoa region, thus contributing to a higher reduction in the number of vehicles entering the city.

C5 Appraisal of evaluation approach

Overall, it is considered that the evaluation approach is in concordance with the measure objectives, and data collection procedures adequate.

Nevertheless, being impaired people a target group, more insight on the effectiveness and perception of the measure among this collective could have been interesting.

C6 Summary of evaluation results

Within this measure, a more efficient information system is placed in operation in order to provide current and potential public transport users with the ability to better plan their trips and optimise their travel times, mostly by reducing waiting times at stops and favouring a reliable connection with other routes and services.

The traveller information system has been very successful, with more than 3.500 daily requests for real time information via SMS or the website. The provided information is highly reliable, with 98,1% of all the information requests assessed as correctly answered by the users. When assessing these figures, it should be born in mind that 60.000 users have access to real time information at the bus stops through electronic boards.

As for the importance that public transport users place over information issues, a survey was carried out among CTSS users. Results revealed that information issues are perceived as very important, with an average score of 8,47 out of 10. User demand for quality information services is therefore very high. Complementing this figure, a user's satisfaction survey revealed a very high acceptance level (7,55) regarding information provision in CTSS' service. This figure is almost identical to the one achieved in the reference year (2006). The fact that high satisfaction levels are maintained is a very remarkable result, bearing in mind that users' expectations were also very high, as revealed in the public perception survey.

C7 Future activities relating to the measure

CTSS will continue implementing real-time information panels at bus stops. It is expected that in 2012 the number of bus stops with this panel will reach 100 stops (aprox. 20% of all bus stops in the city)

Also, the information system via SMS is expected to be expanded to the whole network.

Increased functionalities will be added to the mobile version of the website.

D Process Evaluation Findings

D0 Focused measure

X	0	No focussed measure
	1	Most important reason
	2	Second most important reason
	3	Third most important reason

D1 Deviations from the original plan

There were no major deviations from the original plan.

D2 Barriers and drivers

D2.1 Barriers

The main barriers encountered for the development of measure 73 are:

Preparation phase

- **Technological:** HSDPA-3G communication systems, used for on-board and real time information, are not commonly being used by bus companies. CTSS-DBUS has been one of the first companies in Spain to use this communication system. Therefore, there was no past experience to rely on in the preparation phase of the measure.
- **Financial:** HSDPA-3G communication systems are very expensive.

Implementation phase

- **Spatial:** In some cases road space is not sufficient for the development of high quality bus stops, including shelters and information panels, without jeopardising accessibility conditions on street level.

Operation phase

- **Technological:** Due to insufficient HSDPA-3G coverage in certain points of the public transport network, incorrect real time information for travellers may occur.
- **Positional:** Real time information at bus stops is not available in the whole network. But the success of the measure has increased the user's demand for these kinds of services in all lines and bus stops of the DBUS system. Due to economic and technical reasons this demand cannot always be attended to on the short term. This situation can reduce user's satisfaction regarding information services, although information provision has been improved.

D2.2 Drivers

As for the drivers, the main ones affecting the measure are:

Preparation phase

- **Positional:** The measure is part of an overall strategy to improve public transport quality and promote modal shift. Also there are interactions and synergies with other measures making use of shared technology.

Implementation phase

- **Financial:** The availability of CIVITAS funding has been a significant opportunity to develop these measures.

Operation phase

- **Technological:** The new technology available makes it easier and more affordable to provide high quality information standards.

D2.3 Activities

In order to handle the above-referred barriers and/or to make use of the drivers, the following activities were taken during the implementation of the measure:

Preparation phase

- **Technological:** An in-depth review of best practise regarding bus management systems and communication technologies has been developed, in order to apply the findings in the definition and implementation of the measure.

Implementation phase

- **Technological:** New services based on improved technologies were tested in order to overcome the risks related to insufficient HSDPA-3G coverage.

Operation phase

- **Involvement/Communication:** A close cooperation with the communications technology supplier (EUSKALTEL) was established in order to minimize risks related to insufficient HSDPA-3G coverage

D3 Description of organisations and risks

D.3.1 Measure partners

Following there is a brief description of all project partners and its level of involvement with the measure:

- **CTSS-DBUS** - Implementation of the real time information system on board, via SMS, on website and at bus stops. Leading role.

- **Public Works Department of DSS Municipality** – Construction works related to the implementation of information panels at bus stops. Occasional participant.

D.3.2 Stakeholders

The main stakeholders involved in the measure are:

- **Visually impaired people** – The needs of this particular groups of users have been taken into account in the design of the real time information services
- **LETRALAN** - Development of the new website.
- **PROINTEC/INDRA** - Development of the real time information and the passenger counting system.
- **EUSKALTEL** - Communications technology supplier

D4 Recommendations

D.4.1 Recommendations: measure replication

- **Planning:** A careful selection of the bus stops in which real time information will be provided in the beginning stages of the scheme should be made.
- **Technology:** Search the market in order to find the technology that best fits the needs of the desired information provision scheme.
- **Financial:** Disruptions in the system demand a quick response from the operator in order not to raise negative public reactions. To guarantee the efficiency in the management of this kind of situations, additional funds are required.

D.4.2 Recommendations: process

- **User's information:** Provide clear information regarding the stages in the measure implementation and the long-term objectives, in order to overcome negative reactions towards from users not having this service available in the entire network since the beginning.
 - **On-going communication:** The use of innovative technology requires that an on-going communication framework with technology suppliers is established not only throughout the preparation and implementation phases, but also during the beginning stages of the operation.
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E Summary time schedule

Task No.	Task name	YEAR 1												YEAR 2												YEAR 3												YEAR 4																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48									
8.8	Bus Traveller Information	Red						Yellow						PXE1	Blue												E2	Blue												E3	Blue						Diagonal											
Evaluation tasks																																																										
Process evaluation report																				X																			X													X						
Deliverables																																																										
M12.1 Draft MLEP								X																																																		
D12.1 Final MLEP																												X																														
D12.2 Baseline and first results Temp																																X																										
D12.3 Draft results Temp																																												X														
D12.4 Final result temp																																												X														