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POLICY LEARNING IN INFORMATION TECHNOLOGIES
FOR PUBLIC TRANSPORT ENHANCEMENT

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1. Introduction

According to the INTERREG IVC programme all projects approved in the 4th call will consist in an Implementation Plan. An implementation plan involves specific guidelines which regard each partner region work to integrate exchange information about cooperation policies enacted locally, regionally, nationally.

This document reports on the different experiences acquired within POLITE project outlining the number of the activities implemented and their timing, in addition to Calabria Region responsibilities and tasks management in agreement with the partners involved in the project. In order to be as much implementable as possible, in preparation of the plan the most relevant stakeholders (e.g. Calabria Region Transport Dept. and the University of Calabria) have established well-defined, effective connections among them. The project is carried out and managed by Calabria Region Transport Department which detains formal responsibility. However formal responsibility belongs to the above mentioned offices, it has to be combined with other complementary Calabria Region Departments and additional stakeholders' involvement and commitment to the success of the entire project and designed actions.

In the last years, Public Transportation policies have developed many different services for citizens, such as "infomobility", which provides travellers with information on the Public transportation services available

in their location. However, not all EU regions make use of the same services, which makes it difficult to increase its use at different geographic levels. In this context, Calabria Region as a POLITE lead partner aims to enhance the use of Public Transport by increasing the awareness of infomobility services, providing travellers with adequate and complete information on the choices available.

The main objective of Calabria Region is to improve the public transport information systems.

Specific objectives of Calabria Region include:

➢ to address infomobility, specifically the problem of providing travellers with adequate & complete information on the Public Transport (PT) services available in the regional territory at different geographic levels;

➢ to enhance the awareness of travellers' choice and to increase the use of PT services;

➢ to promote the exchange and the discussion of experiences and to improve on policy-making and knowledge on infomobility.

In order to attain the above mentioned objectives Calabria Region aims to combine transport mobility with technological innovation at different territorial levels as much as possible so as to define public policies in a cross-sector approach of interoperability. The most important project impact on future regional policies proceeds from detailed information about the state-of-the-art of Italian as well as European infomobility by means of selected good practices.

As a final result, POLITE project will enhance the new Regional Transport Plan drawn up especially regarding the ITS section.

2. Calabria Region - general context and LPT services analysis.

Public transport has always been strongly influenced by the morphology of its territory and conurbation in Calabria. It is 15.080,50 km² in area, corresponding to the 11,4% of the entire Southern Italy and to the 5% of the country. Its prevalent landform is characterized by mountains and hills, only the 5% of the region is flat country. The mountainous area is made up of four of the local main ranges: *Pollino, Sila, Serre* and *Aspromonte;* the upland runs downhill towards the coast near *Paola* village. On the other hand, the coastline measures 800 km in length – facing the Tyrrhenian Sea along 300 km and the Ionian Sea along 500 km -; its conformation is varied. It is made up of different environmental situations and ecosystems.

As it has recently happened to the majority of Italian regional districts, Calabria has also experienced phenomena of urban concentration and sprawling city suburbs. Until the last century, traditional resident settlements were mainly centralized. They were founded in the interior, or located on the slopes of the Apennines mountains, often far from the coast. Since then, the development of the urban setting has undergone a remarkable transformation influenced by the construction of the railway (along the coastline) and the settlement of the first coastal aggregations. During the following years old citizenships, characterized by a precise historic identity will be increased by smaller centres involved in common agricultural interests or trade always connected to the major civic hub. Nowadays, Calabria urban framework, according to 2011 ISTAT – National Institute of Statistics – Census, consists in some relevant municipalities: Reggio Calabria (180.817 inhab.), Catanzaro (89.364 inhab.), Cosenza-Rende conurbation (103.039 inhab.), Crotone (58.881 inhab.), Vibo Valentia (33.357 inhab.), Lamezia Terme (71.286 inhab., strongly characterized in terms of infrastructure), and Corigliano-Rossano borough (74.848 inhab.). The majority of the remaining municipalities is equipped with basic infrastructure services; the remaining inhabited area is populated by small towns which have not been able to build up a network of common interests with other civic independent centres outside their boundaries. Precisely, among 409 municipal districts in Calabria: 188 are inhabited by less than 2.000 people, further 188 of them count a population between 2.001 and 10.000 inhabitants, only 28 municipalities are in the range of 10.001 - 50.000 people, merely 5 of the whole number exceed 50.000.

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The most relevant negative result of such a situation is the inability of the urban framework to deliver better quality services, which are typical of metropolitan areas, as a consequence of its dimensional limit. However, small-size towns in Calabria still offer their residents those typical benefits of living in a neighbourhood community: good levels of social relationship, less problems regarding street congestion and traffic, etc. Moreover, the high number villages of historical and cultural value scattered all over the region can be considered a precious resource to develop ecotourism industry locally in addition to supply human protection to a decidedly vulnerable territory. Economy is also affected by the same issue; a lot of businesses find it hard to start up and thrive because they are not effectively integrated with the existing infrastructures and logistics. Likewise, they are inconveniently situated geographically. According to 2012 *Unioncamere* – "Unione Italiana delle Camere di Commercio, Industria e Artigianato" (The Italian Union of Chambers of Commerce, Industry and Crafts) census a very small part of the industrial business community in Calabria has got its residence in specialized areas, where Industrial Development Zones (IDZs) are created in order to encourage increased levels of agglomerations in lowlands. At the moment there are five Industrial Development managerial consortia in Calabria, each located in one of the five provinces of the region (Fig. 1). Overall, 780 companies have established their headquarters within these areas, employing 10,089 people.

Local Public Transport is made of the following infrastructure in Calabria:

➢ railway services, managed by *Trenitalia* Inc. and *Ferrovie della Calabria* Ltd;
➢ road transport, operated by 28 companies united in 6 Consortia.

On a Regional scale *Trenitalia* supplies mainly services aiming at local customers' needs to commute for work or study; jurisdiction is led by the Regional Directorate (RD) of Calabria authority according to 2009 – 2014 service level agreement, besides additional provision supplied by the Regional Directorate of Campania and Basilicata.

Figure 1 – Territorial Distribution of Industrial Development Zones (IDZs) in Calabria.

Regarding Calabria R.D. equipment, 7 million trains per km are produced a year, carrying 20 thousand passengers a day (they are approximately 7 million a year). Moreover, 4,400 customers travel by Campania and Basilicata RDs provided services a day. Rolling stock equipment includes 10 locomotives, 13 electric light engines, 54 thermal energy light means, 20 carriages (source: Trenitalia Inc. 2012). Regarding medium – long distance railway services 12 couples of trains per day are acknowledged on RFI – Rete Ferroviaria Italiana – (Italian railway infrastructure manager) especially driving along the Tyrrhenian coastline, on a national scale. Some services are provided on the free market managed in complete commercial independence by Trenitalia; on the other hand, further transport undertakings – universal services - are provided by Trenitalia with state contribution as established by a specific service contract.

The whole number of trains which travels within the region in an average weekly day in Calabria is 214, as reported by investigation data collected by Trenitalia from the 3rd to the 11th march 2011. It is within Calabria RD field of *competence* that belong 202 of them, 12 out of 214 fall within the scope of Campania and Basilicata RDs. In particular, according to the figures regarding the 5th of March 2012 rail traffic on the regional network within Calabria RD jurisdiction amount to:

➤ 121 trains per day travelling from Reggio Calabria to Sapri on the Tyrrheninan coastline; including Rosarno – Lamezia Terme Centrale railroad, stopping at Tropea and Paola - Cosenza cross-section line;

➢ 65 trains per day travelling from Reggio Calabria to Metaponto on the Ionian coastline;

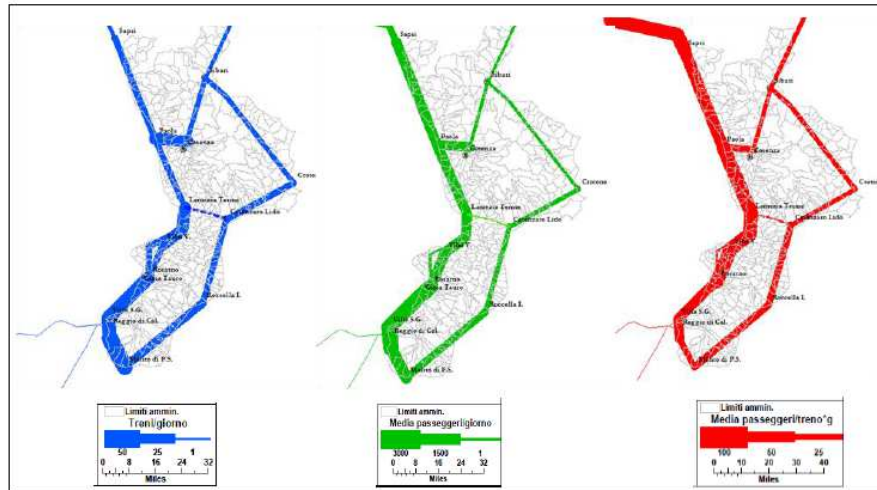➢ 16 trains per day travelling from Cosenza – Sibari cross-section line.

Fig. 2 – Trenitalia data processing, Calabria, Campania and Basilicata DRs. Year 2012
(source: Regional Transport Scheme guidelines)

Ferrovie della Calabria provides railway services between Cosenza and Catanzaro provices – Cosentino/Silana line – and as far as Reggio Calabria (Taurensi line) attending 47 municipalities. The total ammont of regular on road transport replacement services corresponds to 181 trains a day. Circulation on Tauransi line has been suspended; passengers are provided with road transport replacement services on Rogliano – Cosenza and Soveria Mannelli – Catanzaro lines. In 2013 Ferrovie della Calabria company carried out an investigation about how many train routes per day there were between Cosenza and Catanzaro province. Data collected on the 7th of October referred about 181 trains per day specified as follows:

➢ 59 trains per day going from Catanzaro Lido to Catanzaro city centre;

➢ 34 trains per day going from Catanzaro city centre to Soveria Mannelli;

➢ 18 trains per day going from Rogliano to Cosenza Vaglio Lise;

➢ 26 trains per day going from Cosenza Vaglio Lise to Cosenza Casali.

On road transport LPT services are administered by 28 companies which are gathered in 6 consortia pursuant to law 18/ 2006 of the Regional Legislation:

➢ A.D.M. - Autoservizi dei Due Mari co-op.;

➢ Co.Me.Tra. - Consorzio Meridionale Trasporti co-op.;

➢ Tr.In.Cal. - Trasporti Integrati Calabresi co-op.;

➢ T.R.C. - Trasporti Regionali Calabresi Ltd.;

> S.C.A.R. - Società Consortile Autolinee Regionali Ltd.;

> Consorzio Autolinee Due co-op.

Four of the firms which form part of these consortia only supply urban services; 19 of them only provide extra-urban services; 5 companies furnish both urban and extra urban services. The total ammount of available veicles in use in the whole region number 1850 approx. (source: regione Calabria, 2012). Consortia's public transpot offer was 56,2 million of busses per km in 2012. 44,6 million of them drove along extra urban routes; 11 million along urban routes (source: Regione Clabria, 2012). It should be noted that Regione Calabria authorized busses per km a year were 59.7 million as a whole in 2010; 49 million operated in extra urban routes, in addition to 10,7 million employed in urban ones. On road transport was reduced by 0,5 million busses per km in 2011 in comparison with 2010; it suffered a further 3 million busses per km reduction in 2012 in comparisn with 2011. The above mensioned data refer mainly to 2011 and 2012; it must be noted that offer decreased significantly in the second half of 2013.

All in all, it appears *upon careful analysis* that the greatest challenges of LPT are the following ones:

> regarding on *rail* transport: the rolling stock ancient condition and its shunk effectiveness;

> regarding on road transport: routes and stops overlapping of bus driving for different companies on the same territory according to the same timetable.

> Regarding both modes of transport: al lack of integration of traffic modes and their tariffs.

3. SWOT analysis for Local Public Transport sector and its future perspectives

The economic and social cohesion of the territory relies on utilities and transportation system, which has to be consistent, firstly with the European Commission White Paper; secondly with the General Plan for Transport and logistics guidelines; finally with the objectives of the Regional Transport Scheme. The public policy-maker aims to satisfy the generalized demand to optimize the current context transportation in Calabria in compliance with national legislation regulating transport, in order to attain a sustainable development of the territory and contribute to the empowerment and integration of the region nationwide and on a world scale. A state-of-the-art assessment of transport system in Calabria regarding particularly the implementation of ITS has been examined evaluating

Strengths,   Weaknesses,

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Opportunities and Threats involving internal and external factors as summarized by the SWOT analysis below.

STRENGTHS		WEAKNESSES
- The current situation encourages those favourable background conditions to develop highly innovative ITS design providing a benchmark for the other Italian regions; - The IT regional system, which is now being brought to completion, can be considered really efficient and effective in order to maximize LTS performance; - The scientific features of the transport coordination platform *are* suitable to future technological development; - The approach taken fosters sustainable mobility in order to satisfy transport demand needs. It enhances Calabria region integration and competitiveness according to Smart Mobility e Smart Cities guidelines; - Innovative projects value and quality in addition to the expertise and competence staff; - Recent legislation supporting info-mobility progress – they were introduced after POLITE project was launched. - ITS system provision to track almost entirely the fleet in real time – it was introduced after POLITE project was launched.		- Limited use of LPT infrastructure (private means of transport are usually preferred); - Deficient initial conditions of the transport links are caused by territory topography and lack of adequate spatial development; - Regional Public Transport fragmentation: services are usually supplied by a large quantity of small companies with the exception of some urban areas, where a unique firm manages local transport; - There is little synergy among LPT private and public stakeholders; - There is insufficient operative Complementarity and effective exchange of information among LPT various services.
OPPORTUNITIES		THREATS
- Public institutions, private business and research institutes have been challenged by the call for innovative solutions projects to improve LPT; - Determined political and institutional commitment to encourage projects development; - Fostering a new LPT enhanced consumption; - The launch of a dedicated Observatory to monitor how LPT is utilized; - Granting of appropriate legislation supporting the above mentioned projects development.		- Geographically Calabria region is adverse to new transport links design; - Lack of technological literacy; - The complexity of the project suffers scarce coordination, flexibility and governance among the key interacting actors; - Poor consideration towards ICT; - Financial sustainability of the projects.

Tab.1 - SWOT Anaiysis LPT in Calabria.

Within this contextual framework the public decision maker's perspective is consistent with the Regional Transport

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Scheme (RTS) to provide sustainable mobility in the region in order to satisfy transport demand needs. It is argued that this perspective will enhance Calabria region integration and competitiveness according to Smart Mobility e Smart Cities guidelines. *Sustainable mobility* has to be regarded as a strategic pathway to guarantee people's and goods flux without preventing current and future generations from acquiring development opportunities. These objectives has to be persecuted in accordance with all national and European result-driven intensions and plans. Pursuing this ambitious goal definitely affects the definition of RTS policy actions in order to achieve the following three general objectives: social, environmental and economic sustainability; social sustainability includes: accessibility, security and participation pursuant the "Regional Transport Scheme guidelines" (available at www.calabriatrasporti.it) granted by the Regional Decree with the force of law n. 286 of the 5th August 2013. The deriving specific objectives of these measures dovetail further and detailed clarification. They must be pursued according to deliverable institutional, managerial and infrastructural strategies that *can be implemented* in practice through a series of activities which guarantee the adaptation of provisions to reflect endogenous and exogenous constraints associated with transport system planning.

"Regional Transport Scheme guidelines" decree the following specific objectives:

1. ***Respecting the principles of social sustainability:***
   - improving the current level of accessibility, referring to intraregional relations;
   - reduction in the potential for deterioration of the accessibility general condition due to *vulnerability of the* existing *networks*;
   - limitation *of social damage associated with deaths and injuries in accidents amongst all the means of transport passengers;*
   - promoting local authorities, stakeholders and the whole community's involvement in the decision-making in order to increase goals, strategies and actions networking.

2. ***Respecting the principles of environmental sustainability:***
   - reduction in air and noise pollution, in addition to visual impacts;
   - the upkeep of the landscape and local natural resources maintenance against transport system affecting impact.
   - increasing quality of life standards and protecting human health.

3. ***Respecting the principles of economic sustainability:***

- ➢ improving the effectiveness of the transport system;
- ➢ improving the efficiency of the transport system;
- ➢ improving user satisfaction.

A Transport Master Plan has been drafted in application of RTS guidelines; at the moment the Strategic Environmental Assessment (SEA) of the Draft Master Plan has been carried out.

4. The regional management system of Local Public Transport Services in Calabria

Within the general framework of regional "Observatory on Urban Mobility" established by Regional Decree with the force of law n. 23/1999, Calabria Region has signed an agreement with the University of Calabria (UNICAL) to devise, and coordinate a regional system for the management of local public transport services.

The above mentioned concurrence will manage to accomplish its main goals as listed below:

- ➢ Certification of LPT services provided by the Managing Authorities entrusted with the above mentioned remit;
- ➢ provision of info-mobility services to users locally;
- ➢ supporting services to transport managing LPT companies in order to improve their effectiveness and efficiency;
- ➢ data analysis of service performance.

The proposed infrastructure, which specific main characteristics and component elements in terms of hardware, software and services provided - addressing to its scalability criteria - will be suitable to be easily resized, and completed to arrange additional facilities. In this respect, reference is made to some of them:

- ➢ a regionally integrated automatic ticketing system;
- ➢ innovative provisions for passengers transport system and intermodality;
- ➢ developed integrated resources to comprise tourism industry services.

The following section will be dedicated to the detailed outline of the activities the above mentioned management system consists of. Initially, the first phase, which is assigned to putting into service of appliances complying with the certification of transport services provided. At the same time, it will be accurately reported about the functional and technical engineering-design of the whole

system.in order to achieve the above listed objectives and in particular - as far as the initial phase id concerned – the attainment of LPT services certification, the entire project must take into consideration the occurrence of the following subschema and their tight integration:

➢ la Centrale Operativa Regionale – operations centre for the overall region - (hereinafter CORE);

➢ Transport Companies Control System (hereinafter also SICC);

➢ Onboard Vehicle System (hereinafter also SBV), replicated across the entire fleet of vehicles used for local public transport.[1]

General Overview of the System Architecture

The general scheme of the system is organized according to several analytical and applied sections: Regional; Vehicular; Public. At present, the plan is based on the current on road LPT condition, which is operated by 28 companies associated in 6 independent consortia. There is nothing to prevent the system to be managed differently; it could be directed as a private business instead of been governed by a series of consortium agreement.

The architectural organization of the scheme is reported in the picture below (Fig. 2); it shows: the development of the modules, in addition to the subjects involved and the methodologies and set protocols enabling the communication between the diverse parts of the system *to take place.* This structural design is compatible with ARTIST (*ARchitettura Telematica Italiana per il Sistema dei Trasporti* – Italian data transmission applications for the transport system) configuration launched by the Ministry of Infrastructure and Transport in 2001. The heart of the system is unmistakably its Operational Centre for the overall region. On one hand, it interfaces with the vehicles belonging regional transport operating companies; on the other it is connected with the Infrastructure Managers. In this respect it can be noted that, the information which are sent by the vehicles regards essentially: their position - tracked by GPRS/UMTS *system* – and the number of the ride

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[1] In this respect it can be noted that, reference is made to bus transport companies in the vast majority of cases. However, it will be applicable to other means such as shuttle buses, trains, etc.

on the road; at the same time the transport managers transmit to the CORE any variation in the integrated operational variation proposals coming from all the entitled LPT working companies by means of a specific equipment made available to them.

The architecture overview explicitly shows that there exist a computerized interface between the Managing Entity and the transport fleets; it could be employed to transfer data regarding services to be provided from companies to their vehicles in order to authenticate and identify drivers automatically as well as their vehicles. Moreover, data could be cross-checked with those collected information by CORE in order to verify their mutual consistency.

Fig. 2. Analytical Overview of the Regional System for the Management of LPT Services

Furthermore, additional three partners in the Regional System for the Management of
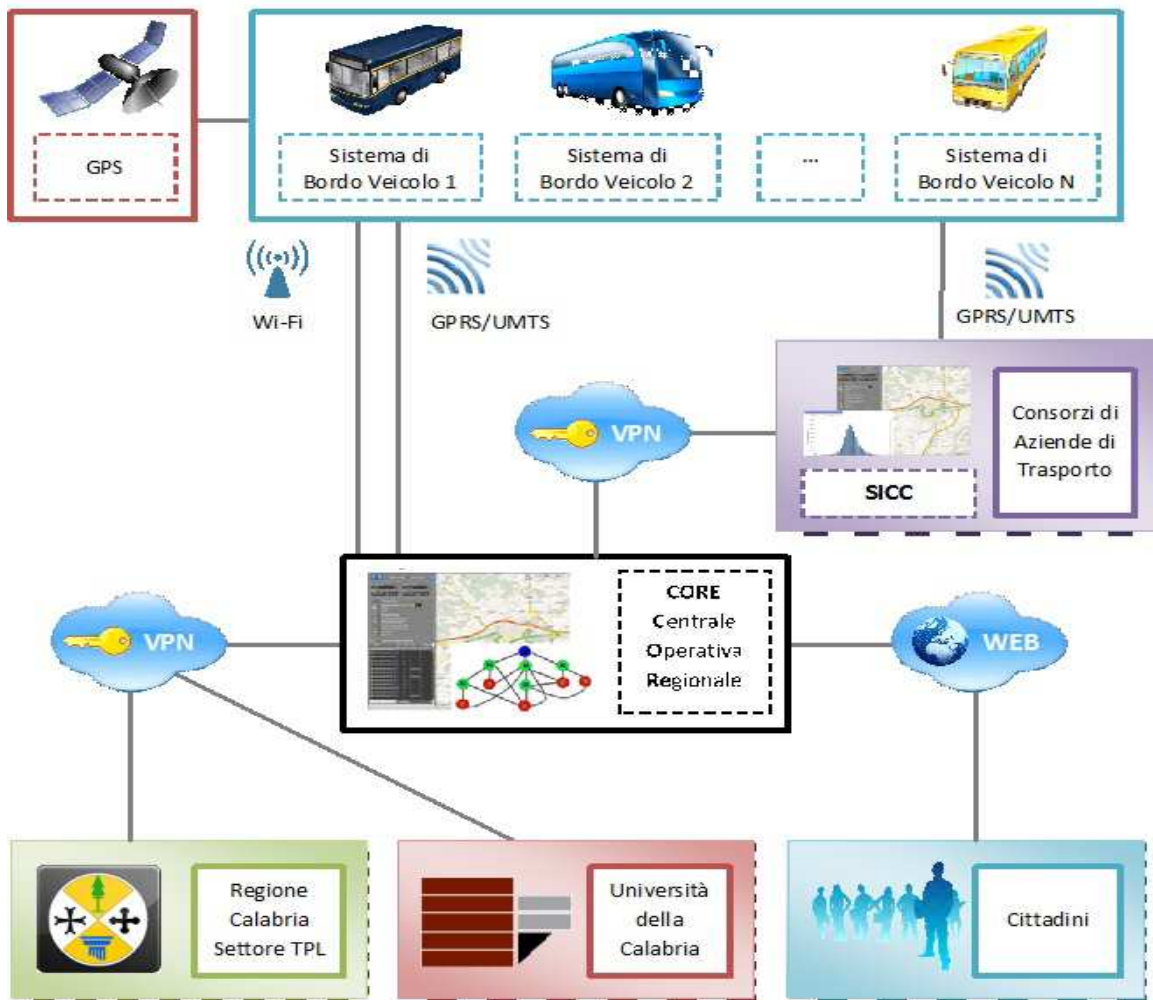
LPT Services should be pointed out:

  ➢ Calabria Region which interfaces CORE with its Local Public Transport Department. Its main

objectives are: to derive statistical data about mobility services, to carry out verifications and cross checks on the information collections, and to verify compliance of actual service on the road with the activity forwarded by the companies yearly operational activity, in accordance with the regional overall needs.

➢ University of Calabria which can access to data collected by CORE as a member of a network partnering Calabria Region in order to: verify CORE functioning, including intervention in case of anomalies where necessary. Furthermore, it can carry out analysis autonomously, define and implement additional innovative services which CORE can provide. University studies and research can be accomplished in the area of info-mobility in addition to their result dissemination.

➢ users (citizens and visitors) who can benefit from info-mobility services - whether free of charge or offered for sale – on the internet or directly by the use of mobile devices.

➢ Finally, the interface between CORE and LPT managing authorities make specialized services (e.g. reporting, contingent variations on operational activities indicated by Calabria Region, statistical analysis of performance effectiveness, etc.) available to the latest.

System Specification Structure

As previously mentioned, the general architecture of the system unfolds a simplified structure in its first developmental phase, which attains to achieve certification of transport services carried out by the managing authorities. However in compliance with a *minimum binding target* of the project it is considered of extreme important by Calabria Region. Concurrently, the above mentioned resolution makes the managing authorities acquire the capacity to *examine and* assess data forwarded by transport companies fleet vehicles to CORE. It should be also noted that such structural design is consistent with the overall architecture to be implemented and a consequent initial application.

The overall planning progress along three successive levels, as detailed below:

At the regional level: Regional Operational Centre – CORE.

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Regional Operational Centre main task will consist in acquiring real-time information about the provisional state of any individual line covered by vehicles in charge of LPT service. According to these data CORE will be able to certify routes operated by any single company member of the Managing Authority.

For this purpose, a comprehensive database is needed on a regional basis. It should record aggregate information regarding the Managing Authority operational activities. Moreover, data should steadily be updated consistently with any service contingently varied. Incongruities with programmed dispositions have to be proposed by the Consortia and approved by the Region, only after an automatic pre-validation has been granted by CORE, according to a specific, forthcoming parameters.

The regional authority will make available to transport companies a standard protocol interface between SICC and the CORE to extract information regarding proposals operating shifts in terms of the accounting year results. Furthermore, Calabria Region will be able to notify changes of financial statements for the current period operated autonomously within established contractual parameters agreed with the Managing Authorities; these variation will be incorporated in the above database and notified officially to the transport companies. CORE is able to collect pertinent, real-time information from vehicles if route numbers are sent directly to CORE at regular intervals (via GPRS/UMTS on board) besides their position detected by on board GPS. An interface protocol will be defined by Calabria Region accordingly. CORE additional task consists in upgrading info-mobility website according to the collected data. This institutional portal aims to make both static (e.g. timetables) and dynamic (e.g. updated routes changes) transport information easily accessible to citizens in real time; Calabria Region, University of Calabria and LPT companies have allowed admittance on a *protected* channel. Consortia participants will be able to constantly monitor their vehicles routes, due to CORE transferred aggregated data, acknowledging any anomalies or irregularities regarding delays, turns in directions, etc., that will expand route records stored in CORE database. At operating functionality the system could be used a communication platform for disputes between Calabria Region and the carriers. Moreover, it could effectively provide users with an interactive functional interface for complaints, warnings, suggestions, etc.

At the Managing Authority level – Transport Companies Control System (SICC)

➢ The Managing Authority will be geared with an autonomous control system empowered to:

- ➢ transferring the latest data variations proposals of the accounting year results to CORE;
- ➢ data acquisition from CORE regarding any single vehicle routes actual condition, in order to verify independently the certified quality of the services provided.
- ➢ The transport businesses involved with the Managing Authority have the responsibility to guarantee the proper operational functioning of their vehicle on board devices, as well as the identification of any single route by its personal code which have been give full acknowledgment by CORE during the route journey. Looking forward to possible further development in the overall system functionality, a broadened role of the SICC is envisaged; it could take part to a wider and more complex integrated network of companies set up by consortia embodied with additional functionalities, such as:
- ➢ services data management (work shifts for the staff and the equipment);
- ➢ conveyance of the updated operative parameters to vehicles in service to automate the route codes identification procedure to be transmitted to CORE;
- ➢ travelling public assistance management services (e.g. info-mobility,
- ➢ on-call services, intermodality, etc.).

At the Vehicle Level - On-board diagnostic system (OBD)

The on-board appliance will be able to report information regarding vehicle localization (current position, stop tracking, automatically-operated door-opening, etc.) to CORE in real time, as well as that route identification number. This peripheral device of the general system is made up of at least: a trip computer, an interactive monitor restricted to the driver's use; it will be in charge of: the whole route identification basic functions; the geographical position of the vehicle (GPS); its regular live correspondence via GPRS/UMTS with CORE or its deferred communication with it, caused by the lack of available mobile multimedia coverage; on-board data storage. Taking into account future technological requirements determined by purposeful regional plans regarding automatic ticketing system, and innovative transport services, the vehicle on-board device would be able to receive data from CORE, for example information about the following stop, weather conditions, on road traffic. Furthermore, it would be geared for integrating all on-board peripherals, in order to operate the following services.

- ➢ ticketing (validators, ticket machines, smartcard readers, etc.);

> on-board announcements to travellers (illuminated visual displays and audible devices electrical annunciators, estimated times of arrival, vehicle location, tourist information);

> on-call services.

Scheme of data flows within the system

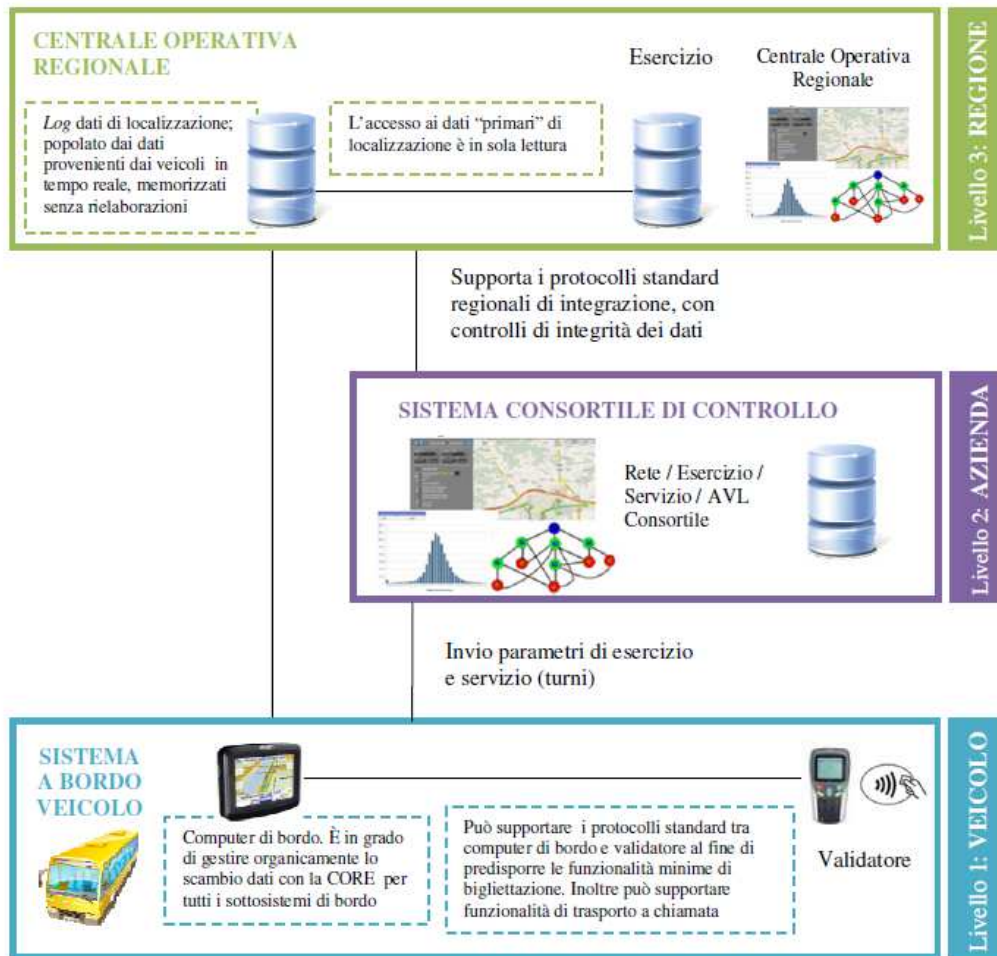A exemplifying scheme of data flows within the system and their management is illustrated below (Fig. 3).

Fig. 3 – Scheme of data flows within the system.

The ensured functionalities encompassed at each level of the architecture are the following:

> Whole Operation Centre for Automatic Vehicle Location (AVL) tracking system, including:

- Ascertaining of route tracking data coming from means of transport in real time;

- provision of tracking information in real time;

- off-line data processing for LPT services accreditation;

- making public statement about the certification of the services provided by each vehicle fleet to CORE and consortia authorized personnel (selection of data can be led in terms of line/stretch of road/route/stop);

- single vehicle recorded location-data query tool (logbook);

- Remote analysis of regularities[2];

➢ Interface with the control monitoring system, *so as to:*

- allow updated provision data transmission - variation proposals for services – in addition to consult information recorded from tracking activity on the corresponding company fleet vehicles;

- process and harmonize service provision data forwarded by each company in order to licence route/stretch accurate scrutiny when operated by different carriers;

- make vehicle location data records – single or aggregate - available, on request;

- provide appropriate equipment to potentially lodge complaints about service provision expense report.

- Interface between spatial information systems in the region (via LAN or GPRS/UMTS according to their location) in order to guarantee the interoperability of data in real time to info-mobility subsystems - info-mobility portal, destination signs. These variable message panels will deliver both static (route schedule) and dynamic information about transport. They will be able to inform passengers about early/delayed arrival of any single vehicle as well as route change or emergencies, etc.

Control monitoring system

➢ complete provision data configuration management utility to provide such information in aggregated form for all transport companies;

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[2] Authorized CORE personnel – in particular single Managing Authority companies with the remit of their fleet – are allowed to notify constant discrepancy between scheduled service and the recorded one using business intelligence *special IT tools. Moreover, they will be able to highlight correspondence among the occurrence of events an finally, they will be able to* suggest corrective measures and verify their effectiveness.

➢ operational data variation assembled proposal submission to CORE by communication protocol set up in the course of the detailed and execution design of CORE implementation;

➢ monitoring and analysis of data coming from each fleet vehicle conveyed by CORE in order to set an assessing benchmark for route effectiveness and possible complaint lodging, etc.

It is also pointed out that further functionalities than those above mentioned can be envisaged, including:

➢ consortia provided services configuartion data: la programmazione del servizio;

- variations in the scheduled services to be provided, for example: macro-irregularities – route cancellation or any deviation from planned itinerary;

➢ AVL control monitoring system autonomous management;

➢ Upgraded operational and provisional data processing to companies vehicles in order to enhance the automatic identification of the route, whose coda must be forwarded to CORE.

On-board Vehicle System Device

➢ Location data collection – shift/route beginning, vehicle position, stop recognition, doors opening, etc. – in application of an appropriate communication protocol;

➢ Real-time location data processing to CORE in application of an appropriate communication protocol;

➢ degraded and emergency conditions operational strategies, in case of:
- alternative stop recognition mode on-board because of vehicle equipment lack;
- navigational integrated dead reckoning aid, in case operational anomalies in GPS functioning occur;
- local data retention until communication reset if GPRS/UMTS information access technology does not work properly;

CORE platform: accessibility and provided services

Fig. 4 – CORE Home Page

User levels

The users of the on-line platform belong to different segments; their different operator-profiles are based on specific sets of functionality and privileged access to the system. Two macro-segments can be differentiated: the Administration Division; the Transport Division.

The first segment personnel are currently entitled to all system resources logon rights; they are authorized to the on-line platform management in all its aspects. The second segment refers to the transport system actors; it is subdivided in the following operational levels:

Calabria Region; Managing Authority; Company.

Finally, other functionalities are envisaged for users who cannot be associated the above mentioned profiles.

Functionalities

The system functionalities for both the above mentioned segments will be described below.

No profile user

Services data view

The common user has access to services data regarding each company transport provisions, such as its route lines. The customer's experience is enhanced by cartographic references, like maps which can

add visual support to the travel information. This operational functionality is usually retrieved by LPT system habitual customers, those who already know the country area and the performing carriers.

Routes planning

Users can select: the means of transport connecting a point of departure with a destination; they can specify which stop they want to conclude their journey or they can specify its place name. According to this last option, the system will suggest the closest stops to the intended location. Furthermore, provision is made for routes planning which involve more than one means of transport, wherever the journey cannot be accomplished by a unique vehicle of a single carrier. This operational functionality is more commonly carried out by strangers to the local area and the performing carriers.
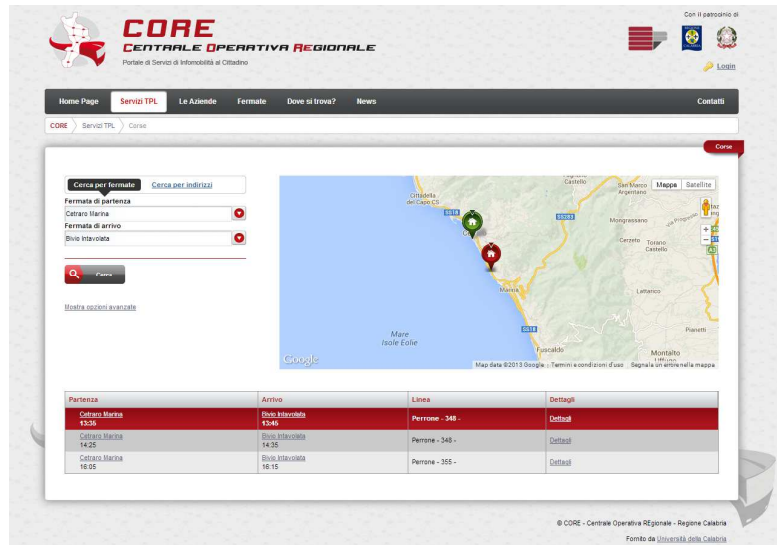

Fig. 4 – Routes Planning.

Carriers master data view

The user can access information regarding any Managing Authority, in addition to each transport company.
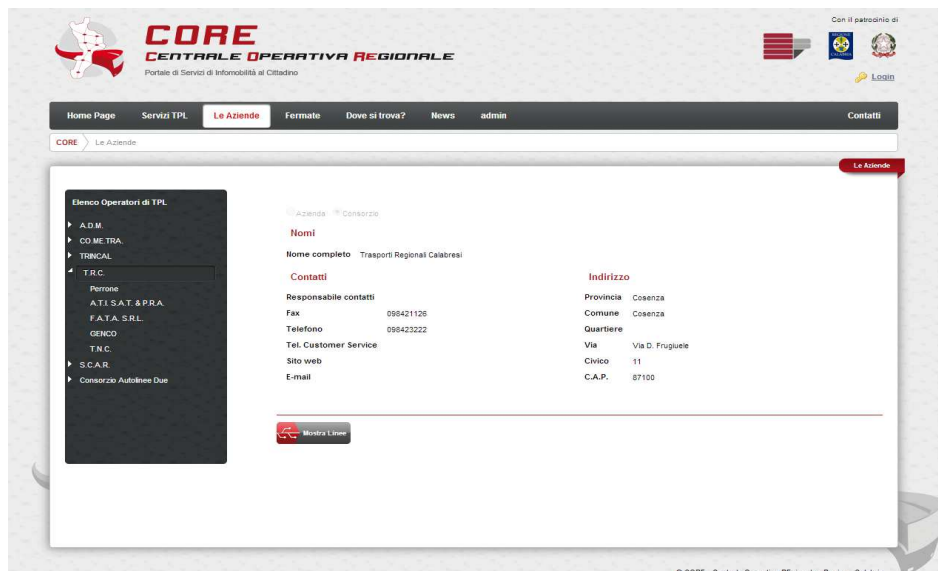

Fig. 5 – Carriers master data view.

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Route stops display

The user can have displayed the list of the route stops all over the region featured by a picture of each of them as well as their localization on a cartographic map. Moreover, further information about routes are provided.
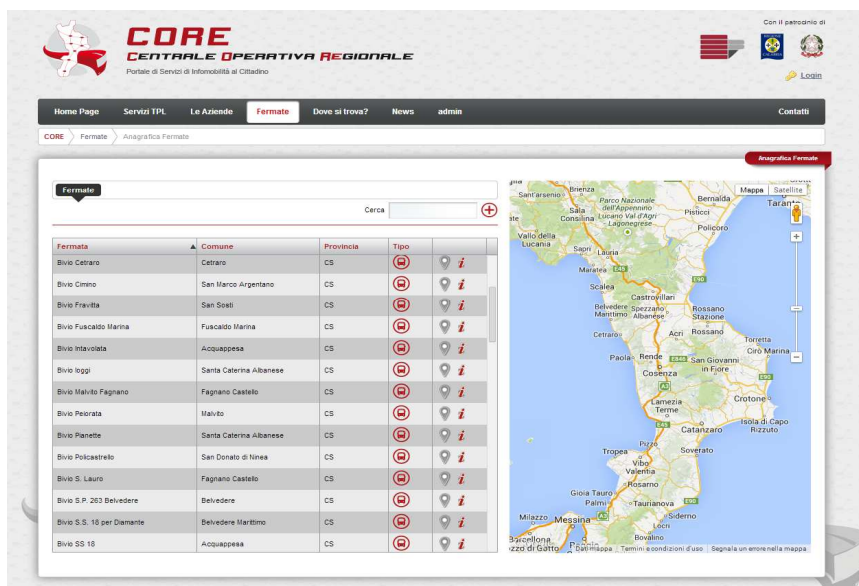

Fig. 6 – Route stops display

Route stops search

The user can conduct archival quest for route stops starting from various search criteria: its name, address, geographical coordinates, and typology.
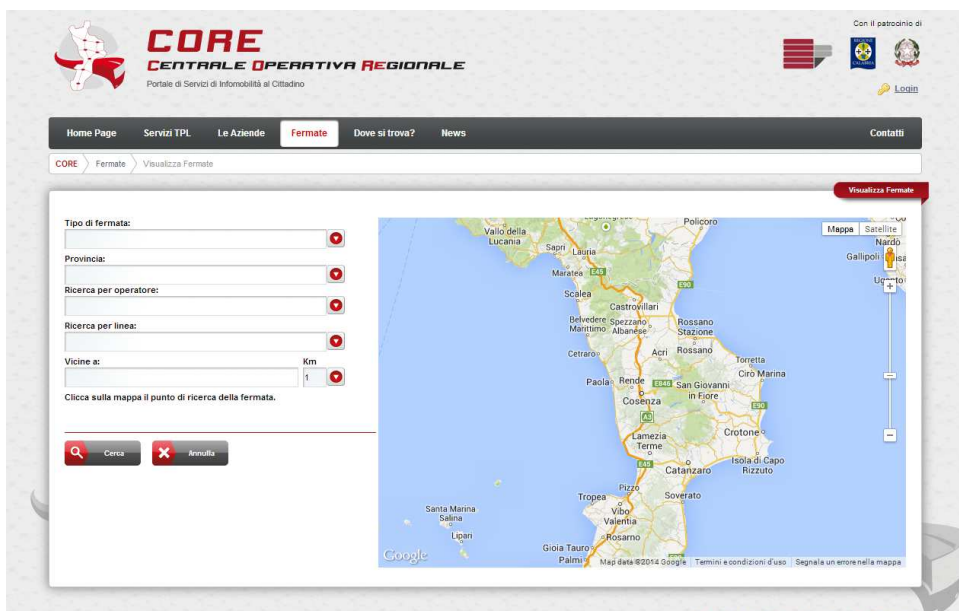

Fig. 7 – Route stops search.

Monitoring of the services performance

The user can track a route itinerary up to its final destination, accessing information about the last stop served, and contingent delays.

Transport Division user

The operational functionalities provided for the Transport Division user include all platform data processing. Access to information is admitted according to the user profile:

➢ at Calabria Region level: comprehensive admittance to data;

➢ at the Managing Authority level: admittance to whole information regarding partnering companies;

➢ at the company level: admittance is reserved exclusively for information pertaining to it.

Finally, procedural writing have been arranged in such a way that at Calabria Region level the user can directly affect data; on the contrary, variation proposals coming from users belonging to the other two levels of the structure require regional consent to take effect.

Management of the fleet vehicles

The LPT total operating fleet can be viewed and easily managed on-line. Several attributes can be outlined to each vehicle, such as its license plate, the type of engine, the vehicle registration certificate in PDF format, etc.

Administration of the stops directory

The user can implement the stops directory supporting configurable, role based access control for insertion, update or deletion of data records. In case the insertion regards an additional stop, which is in close proximity of the existing ones, the operation will be prevented with respect to the uniqueness and standardization of the record.
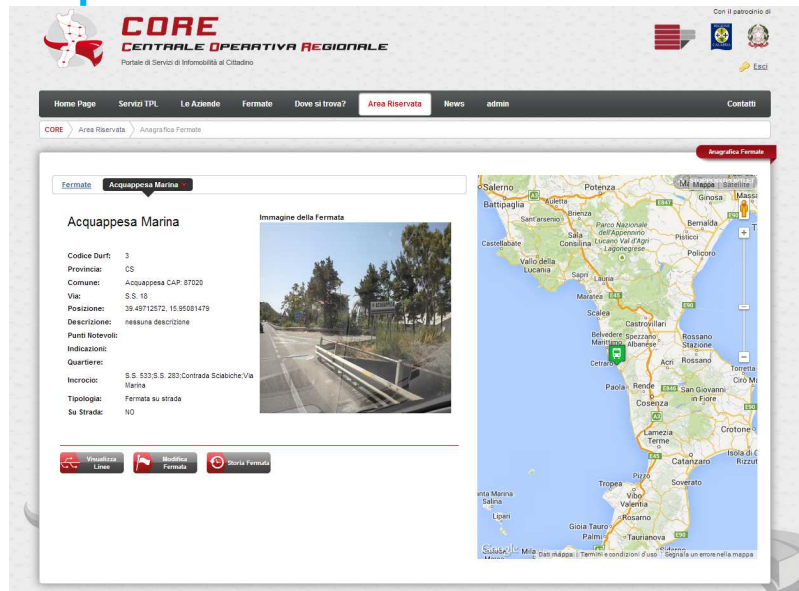
Fig.8 - Administration of the stops directory

Monitoring of the fleet

Any fleet vehicle can be monitored in real time, including actual traced route and its logbook displaying the events happened on-board in their entirety.
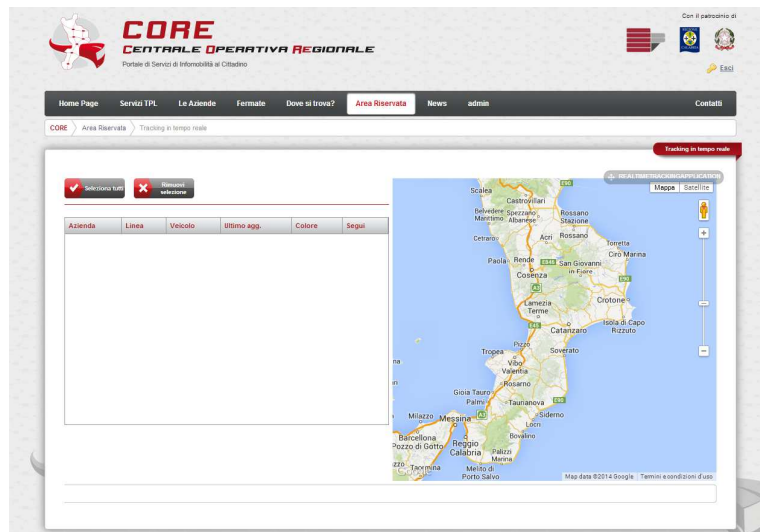

Fig.9 - Monitoring of the fleet

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Management of certification of services

The certification process of service providers actually occurs in real time. Specialized applications have been arranged for users in case of disputes whether automatic data processing reliability fails. Details about distance are provided specifying the margin in kilometers between the nominal distance and the route actually traced, in addition to the vehicle reference number and the time of arrival at every stop. It is on the basis of such information that an accurate analysis of the transport provision is carried out in order to highlight it weaknesses and enhance the customers' perceived quality of the provided services.

Claim ticket management system

In order to streamline anomalies in the certifying automatic system (e.g. a route has been cancelled because of disruptions at a road intersection) claim ticket can be opened to initiate Dispute procedure. Every claim ticket is assigned a unique controversy between two users. It can progress towards resolution or its demise according to the outcome of discussions.

Datamining technology:

The extraction of data can be undertaken in different formats:

- Timetables in PDF and Excel;

- Company database in Excel;

- Operational schedules in Excel;

- Provided and certified services history record in PDF.

Administration user

The Web portal can be entirely operated by Administration users concerning aspects related to both its layout and content. A convenient dashboard allows access to a series of management utilities:

- Personalisation of the webpages content;

- Personalization of the webpages layout;

- Internationalization of the portal;

- Consumers' access to the portal;

- Cache supervision;

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- SEO processing

- plug-in supervision to implement its potential expansion.

5. Best practice

POLITE Project was enhanced by Calabria Region Department 5 - EU Special Programmes, Internationalization, and International Co-operation in concert with Department 2 – Calabria Region Presidency – and both Department 4 – Local Public Transport, Regional Transport Directorate, Intangible Infrastructure Networks – in addition to Department 9 – Local Infrastructures, Public Works, Housing Policies, E.R.P. (public social housing), A.B.R. (the local water supply agency), Water Resources, Integrated management of Water Cycle. The first has carried out the activities envisaged by the project, the other partners have been committed to developing and drawing up the Implementation Plan of the transport policy in the region.

POLITE project has been a substantial mainstream to identify best practices which could have successful effect in Calabria Region context. Consequently, the proposed local Implementation Plan, intended to be the final project output, can be considered a highly relevant document supporting the Region Transport Scheme executive plans in areas of joint actions, where (Fig. 9) an ITS (Intelligent Transport Systems) organization has been conceived pursuant the Regional Transport Scheme guidelines.
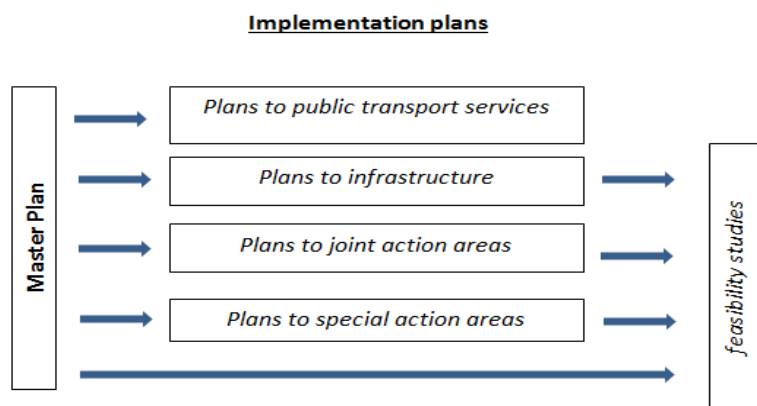

Implementation plans

Fig. 9 – Technical subdivision of Implementation Plans and Feasibility Studies
(Regional Transport Scheme guidelines)

The methodology employed to index best practices is based on a comparing multi-criteria analysis which considers a series of measures (and sub-measures) enabling public transport objectives to be favourably accomplished. The contrastive assessment and the subsequent choice of best practices was undertaken in regard of a common project functional purpose divided into the following categories:

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1. Information about the Public Transport System and/or Multimodal Transport (Automatic Vehicle Location – AVL; Real Time Passenger Information Systems (RTPI; Real Time Traveller Information Systems RTTIS; Journey Plannis Systems);

2. PT Fleet Monitoring Systems;

3. Intermodal PT Systems;

4. PT Priority Systems;

5. PT Payment Systems (Pre-pay contactless smart cards, Innovative Incentive schemes).

The comparative methodological analysis of Best Practices (BP henceforth) involved the following phases:

➢ Phase 1: investigating BP reports and POLITE Project partners questionnaire replies;

➢ Phase 2: categorizing BP in regard of their project functional purpose;

➢ Phase 3: determining each BP main priority objectives;

➢ Phase 4: selecting the performance indexes in reference to any single BP/Determining whether a measure allows BP objectives to be achieved;

➢ BP comparative analysis and consequent selection of the worthiest in each group of Best Practices.

According to 3.2 B project activity of analysis and targeting significant BP, 32 Best actices from all over the EU have been selected; 6 of them underwent a location survey inspection.

The Best Practices specifically selected by Calabria Region in the context of POLITE Project and subsequently imported by the Implementation Plan are:

A. MULTIMODAL PLANNER "IDOS" (CZECH REPUBLIC);

B. MI MUOVO PROJECT (ITALY- Emilia-Romagna Region);

C. TRAVELLER INFOBUS (ITALY – City of Cosenza);
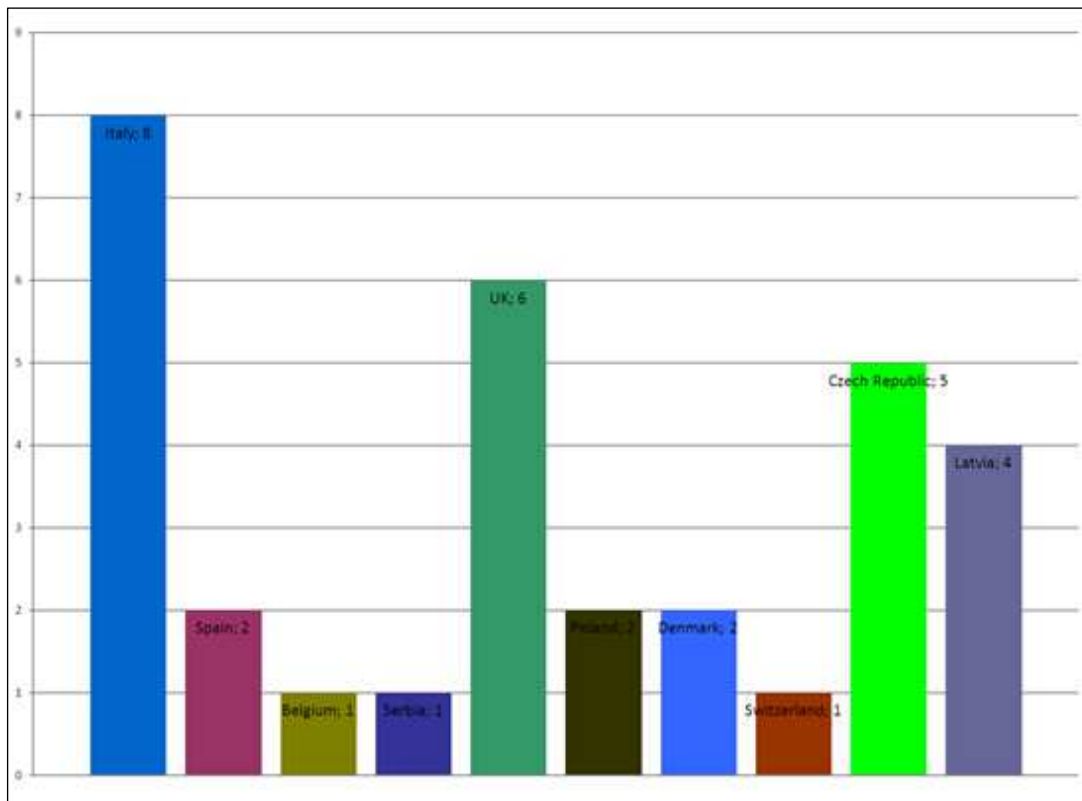
D. MyCicero (ITALY – Marche Region).

Fig. 10 – BP countries of origin.
(Source: POLITE - CP3: Report on GP)

A. MULTIMODAL PLANNER "IDOS" (CZECH REPUBLIC) - Europe's best multimodal planner 2012 in the EU's First Smart Mobility Challenge competition, IDOS is a door-to-door journey planner for the Czech Republic and Slovakia.

It also provides other cross-border connections travel around Europe by bus and train. The traveller multimodal public transport information as well as the planning and payment systems are available for: 1) personal computers and networks, 2) PDA and smartphones, 3) Internet, 4) mobile phones (SMS, call centres). It is one of the most visited Web sites in the country, recommended to be followed and to share knowledge and experience. The reason for the re-use is the flexibility and integration of service delivery.

The following chart reports a SWOT analysis about the Good Practice relevant transferable actions to Calabria Region context.

Strengths	Weaknesses
1. Easy orientation, user friendly application. 2. Aggregator of information, integrates multiple sources of information in order to provide a complete information solution. 3. This solution allows the use of the same search algorithm on different platforms. 4. The main benefits of the Public Transport policy was the unique policy, that facilitates the development of the real time system: a multimodal planner. 5. Central information system about Public Transport and PT timetables established in the legislation. 6. The flexibility and integration of service delivery. 7. Recent Legislation.	1. Human resources and duration of training. 2. Data availability and enforcement.

Opportunities	Treaths
1. Ability to create economies induced. 2. Encouraging new target use. 3. Future tecnologica developments.	1. Financial resources availability for development. 2. National wide data formatting. 3. Decisions on co-operation of public and private sector for optimization of operation and maintenance costs.

Tab.2 – SWOT analysis about the Good Practice relevant transferable actions of *MULTIMODAL PLANNER "IDOS"*

B. MI MUOVO PROJECT (ITALY) – Emilia Romagna region has deeply committed to the fundamental planning tool through which ITS sets up. Regional mobility policy in favor of a more sustainable mobility, has implemented the integrated fare (bus plus train) and electronic ticketing system called "Mi Muovo". According to the GIM progject AVM systems were installed on every bus all over Emilia Romagna region, in addition to electric information signs at bus stops.

STIMER Mobility is the regional integrated fare (bus plus train) and ticketing system which aims at accessibility and promotion of public transport in favor of a more sustainable mobility all over the region. In the framework of this initiative the new integrated one comprehensive ticket was introduced, making traveling by LPT in Emilia-Romagna more comfortable, simple and easy. The new fare system is based on areas (zones) to be crossed, electronic ticketing, chip card, contactless ticket punches, centralized ticketing management system. The fare integration is made possible through the chip card "MI MUOVO (I Move)".

The reason for its advantageous replication in Calabria is the integration of the system that could be desirable for the electronic ticketing service in the region.

The following chart reports a SWOT analysis about the Good Practice relevant transferable actions to Calabria Region context.

	Strenghths		Weaknesses
1.	The key policy is the realization of tariff and modal integration regarding the services of LPT and other complementary services through the technology interoperability.	1.	Difficulties are in the definition of rules for the revenue allocation among LPT companies (bus, train, etc.).
2.	The success factors consist in improving user access to the provided services, clearer tariffs, and easier ticket purchase.	2.	Consultations among different actors involved can reveal quite difficult.
3.	Improving Public Transport attractiveness.	3.	Reorganization concerning training and qualification of a specific staff and also a change of the sectors interested to the ticketing service (sales channels, data loading, sales management, marketing) and so on…
4.	Improving Public Transport efficiency..	4.	The enterprises continuously participate to evaluate the system throughout its development, dealing with an innovative and articulate project.
5.	Improving urban areas accessibility.		

	Opportunities		Threads
1.	Ability to create economies induced.	1.	Flexibility, coordination and hard sharing with all involved actors are the strength factors for the implementation of such a complex project.
2.	Encouraging new target use.	2.	Possible difficulties of interaction between the protagonists.
3.	Future technological developments.		

Tab.3 - SWOT analysis about the Good Practice relevant transferable actions of *"MI MUOVO PROJECT"*

C. TRAVELLER INFOBUS (ITALY) - Through the InfoMobility application developed in the city of Cosenza, the users can check the surrounding public transport bus stops on the map. The users can locate the closest stop and pertinent busses and automatically download updated information about them; they can zoom-in and zoom-out on an interactive map to check stops of each routes in addition to track the selected itinerary all over the city.

If further developed this application results could be easily *disseminated a*nd exploited in the main urban areas as well as in Calabria provinces to support citizens' and tourists' mobility.

The following chart reports a SWOT analysis about the Good Practice relevant transferable actions to Calabria Region context.

	Strengths		Weaknesses
1.	Easy orientation, user friendly application.	1.	Low use.
2.	Minimization of mobility time in urban area.	2.	No project plan of marketing for users.
3.	This solution allows the use of the same search algorithm on different platforms (e.g. IOS – Android).		
4.	Implementation of public services.		

Opportunities	Threaths
1. Ability to create economies induced. 2. Encouraging new target use. 3. Future technological developments.	1. Low Internet literacy of the actors (the receiving target user cannot be IT capability deficient).

Tab.4 - SWOT analysis about the Good Practice relevant transferable actions of "Traveller Infobus"

D. MyCicero (ITALY) - MyCicero is a multi-channel platform – Web smartphone touch screen – to enhance the development of the territory. It concerns dynamic digital communication among users and stakeholders; it aims at the integrated and sustainable development of the local community. MyCicero provides individualized support to the user, tailored to specific needs in relation to mobility, transport and parking, as well as shopping, customer loyalty policies, public services, hospitality in addition to cultural events and entertainment.

Applying for a *single registration* of MyCicero give admission to local information in real time; it provides access to a national and international network of public and private services. It is a digital platform based on a crowdsourcing logic: one's needs become opportunities for others in an on-going virtuous exchange between reciprocal benefits.

Furthermore, MyCicero offers: payment services – electronic money, and reserved Pos-mobile device; municipal services – expiry dates notes, notifications, info-mobility, payments; free-time utilities: itineraries, package tours, offers, promotion goods, information about sport, cultural events and entertainment; hospitality - luxury, leisure. MyCicero can be operated on mobile phones by specific Apps displayed in stores, but also by touch technology devices through digital signage.

The following chart reports a SWOT analysis about the Good Practice relevant transferable actions to Calabria Region context.

Tab.4 - SWOT analysis about the Good Practice relevant transferable actions of "My Cicero"

Strenghths	Weaknesses
1. Aggregator of information, integrates multiple sources of information: transport information and services; business and tourist information. 2. Improving cities attractiveness. 3. Improving LPT services effectiveness and efficiency.	1. Limits to the part of purchase user defined, however estimated fair. 2. Limiti, comunque ragionevoli sulla parte di acquisto segnalati direttamente dagli utenti utilizzatori. 3. Rapidity and immediacy of the application should be expanded and optimized.

Opportunities	Threaths
1. Innumerable business opportunities induced. 2. Attractive application which encourages new target use and fosters IT literacy regarding the transport sector.	E. Low Internet literacy of the actors (the receiving target user cannot be IT capability deficient). F. Possible difficulties of interaction between the protagonists.

6. Local implementation plan objectives

The general objective of this Local Implementation Plan is *"to encourage the use of innovative technology solutions that enable the increase of the degree of efficiency and quality of public transport service and that will increase the accessibility of the service and the passenger intermodality in order to make the public transport service competitive, at different territorial levels, compared to private transport "*

The above mentioned objective derives from the analysis of public transport current situation in Calabria, as well as the experiences gained from POLITE project knowledge-transfer activities by Calabria Region Institution. The specific objectives that the Region intends to pursue in order to achieve the overall objective are:

   I. *Increasing the degree of efficiency and quality of public transport service.*

   II. *Increasing the accessibility of the service and the passenger* intermodality.

In order to achieve the above specific objectives the following operational goals have been determined:

   1. to improve monitoring and evaluation of service *provision;*

   2. to improve the level of accessibility to public transport*;*

   3. *to encourage* intermodality *and integration of fares;*

   4. *to improve the quality of service perceived by users*;

   5. *to encourage the provision of public transport services adapted to the flexible needs of specific users' categories.*

da cui si è preso alcune parti per integrare e perfezionare l'attuale "Sistema regionale per la gestione dei servizi di Trasporto Pubblico Locale". Per il raggiungimento degli obiettivi operativi sopracitati, sono previste le seguenti azioni:

The selected best practices within the activities of POLITE project have been the basis to develop the actions of the Local

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Implementation Plan. In particular, it was remarkably relevant to make a comparison between Calabria Region CORE system and the MULTIMODAL PLANNER "IDOS" (Czech Republic), MI MUOVO PROJECT (ITALY), AMACO INFOBUS (ITALY), MyCicero. They were source of inspiration to ameliorate and enhance the quality of the regional management system of Local Public Transport Services in Calabria.

In order to attain the above mentioned operative objectives the strategic actions to be pursued are outlined as follows:

1. *Current operational facilities integration with other transport systems;*

2. *Optimization of infomobility services;*

3. *Introduction of e-ticketing and implementation of innovative payment systems for intermodal mobility services;*

4. *Info-mobility system development for the introduction of added-value services for the tourism industry and the local marketing enhancement.*

7. Local implementation plan policies.

The local Implementation Plan has assimilated and integrated information and ideas experienced by the best practices selected during the POLITE project plan of activities was enhanced within the local context.

The leading idea of this course of actions considers each strategic action featured in the Implementation Plan capable of empowering, integrating and ameliorating the regional management system of Local Public Transport Services (Fig. 3). Consequently, better comprehensive services will be provided to the final user forwarding consistently the regional institution info-mobility policies.

A series of short-term more easily achievable actions have therefore been undertaken (a maximum of 1-year time frame) in order to improve the system forthwith. Besides, more elaborate actions to be attained in the long term (a maximum of 3-year time frame) will require longer periods of performance because of their complexity.

➤ **Action plan – Best Practice susceptible to be implemented in the short-term**

Action 1: Current operational facilities integration with other transport systems
Specific Objective: to improve monitoring and evaluation of service *provision;* to improve the level of accessibility to public transport*;*
The regional Operations Centre potential effectiveness allows an operative integration of the information system with the railway services provided by **Trenitalia** and **Ferrovie della Calabria** advantaging the final user in the short term,

1	**Action description**	in addition to on-road urban services. This activity will require the pre-existing stored information transfer to the operations centre CORE.
		The collected information facilitates the most important quality factor for the final users to be enhanced: an Integrated Timetable of the Transport System in Calabria. It will incorporate all data about the public transport promising itineraries plan all over the LPT network by any available means of conveyance. At present the integrated timetable regards LPT on road; participating the railway system will improve the quality of the services fostering intermodality. The integrated timetable is a search engine - operated on a Web platform – displaying detailed timetables, routes, connections, public transport journey times, etc. in Calabria in reference to both via road or by rail travelling relying on scheduled means of transport activity.
		Provided the integrated timetable, by any LPT means of transport (on-road, by rail) it will be possible to access the following services:
		➢ To establish a line of travel all over Calabria by integrating numerous means of transport (coaches, trains on a national or regional route, cable trains);
		➢ To enter the location of departure/destination according to: the name of the railway station/service stop, the address, areas of interest by means of a cartographic interface. Furthermore, a transition station can be also specified;
		➢ To select the day and time of departure/arrival of the journey;
		➢ To exclude/include certain means of conveyance;
		➢ To facilitate arrival in destinations of particular concern (POI: Point of interest) in the region such as hospitals, museums, theatres, universities, public institutions, sport facilities, etc.;
		➢ To view information as An infobox template to be easily printed;
		➢ To acquire information about train station/service stop timetable in relation to different time slots;
		➢ To acquire detailed information regarding a single route;
		➢ To select multilingual interfaces (Italian, English at least);
		Calabria Region considers this action a first step forward ITS integrated system to overcome the current information gap which has hindered the optimal public transport employment by the citizens, with particular reference to intermodality.
2	**Possible changes to the current public policies**	This action will be carried out consistently with the current LPT development policy implementing the functions of the current management system.
3	**Stages of the Implementation Plan**	The activities are developed according to the following work phases:
		➢ Analysis of data collection plan (1 month);
		➢ Adjustment of the existing auxiliary equipment on board of vehicles (4 months);
		➢ Plan design (1 month);
		➢ Implementation (3 months)
		➢ Debug/Test (1 month);
4	**Responsible Authorities**	Calabria Region – UNICAL
5	**Actors to be involved**	Companies : Trenitalia – Ferrovie della Calabria
6	**Software development financial resources**	Human resources: n. 2 developers Developer daily budget: Euros 250 6 months total budget for n. 2 developers: Euros 60.000,00
7	**Auxiliary equipment financial resources**	Ferrovie della Calabria auxiliary equipment ➔ Number of engines unequipped: 7 ➔ Single engine equipment budget: Euros 20.000,00 ➔ Ferrovie della Calabria total budget: Euros 140.000,00

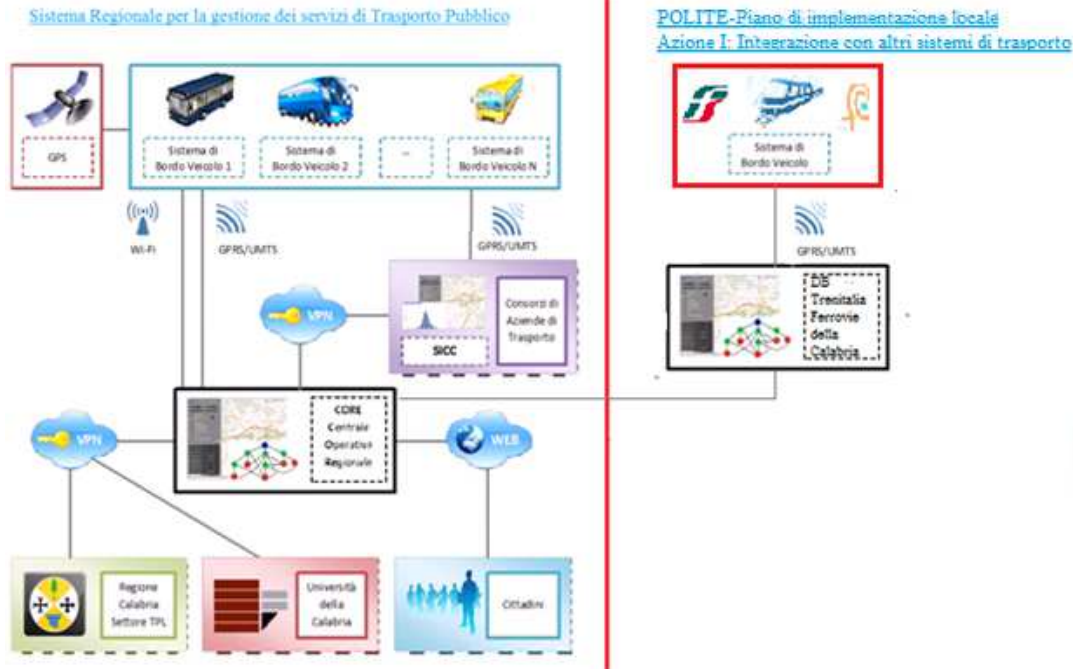| 8	**Total amount of financial resources**	Euros 200.000,00
9	**Timing and Deadlines**	Adjustment of the existing auxiliary equipment: 10 months Days/Developer: 120 Total amount of time in days: 120 Total amount of time in months: 6
5	**Best Practice of reference**	MULTIMODAL PLANNER "IDOS" (Czech Republic)

Fig.6 – Logic diagram of the current "Regional System for the Management of LPT Services" integrated with Implementation Plan action I.

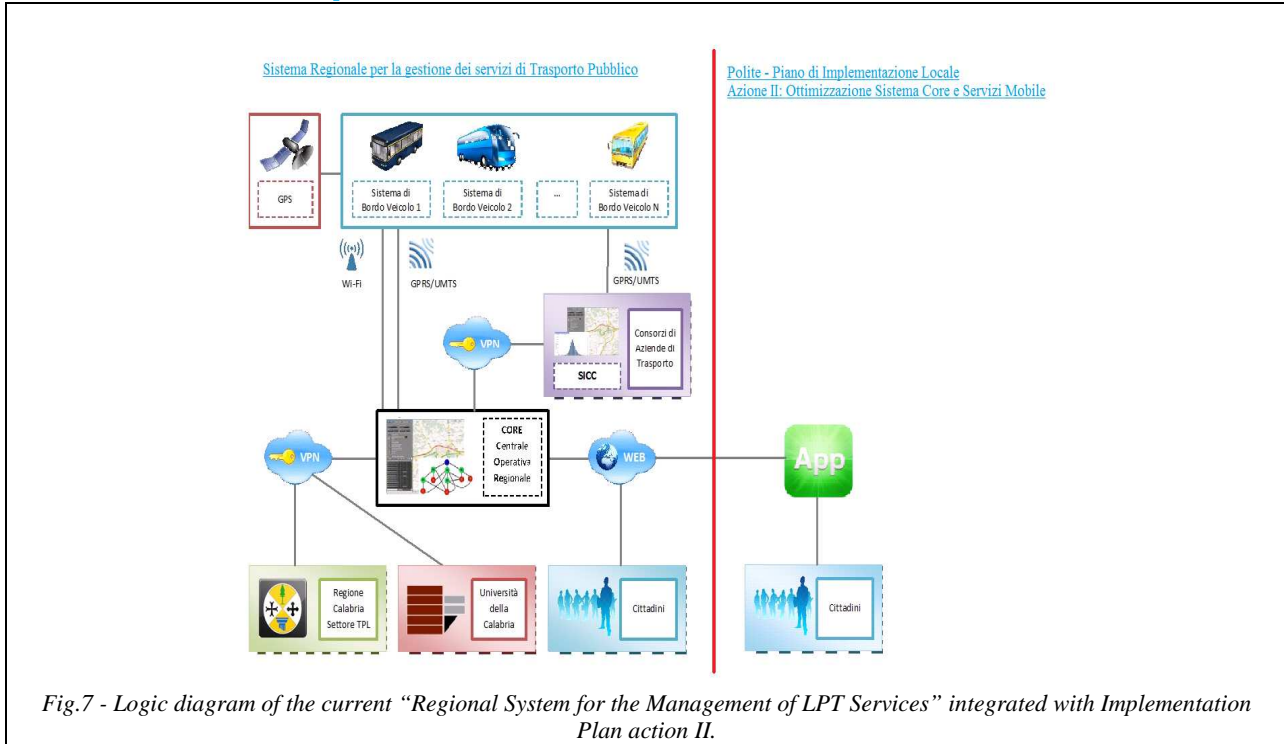| **Action II: Optimization of infomobility services** |
|---|
| Specific Objective: to improve the level of accessibility to public transport; to encourage intermodality and integration of fares; |

| 1 | **Action description** | The action consists in the data processing stored into the Regional Operations Centre – CORE also forwarded by Mobile application, as it usually carried out in Cosenza municipality.
The user will access every information regarding urban, extra-urban bus routes, as well as trains operated within Calabria as a result of downloading an App common to whole region. The updated data will be about: the selected transport vehicle and the nearest stop to the passenger's position as it currently happens in Cosenza municipality due to the application operate by AMACO company.
The application to be developed will be distinguished from the existing one in use within Cosenza municipality according to the following features:
➢ The first will trigger data collection at the Regional Operations Centre – CORE. All public transport companies are compelled to forward data regarding services stops and route timetables pursuant to law 67/2012 of the Regional Legislation established by Regional Decree with the force of law n. 123/2013.
➢ The second processes data by the use of a system installed on a cloud server |

		according to the user's different needs. Data format are configured according to the European standard Transmodel. As mobile devices are concerned, HTML5 Mobile Application development is envisaged. It consists in a hybrid solution implementble in HTML5, CSS3 and Javascript languages; through open source frameworks, if possible. In other words, the hybrid App solution will enhance original APP development equipped with management tools based on an HTML interface like Web APPs allowing multi-platform utilities effortlessly. Furthermore, certain APPs replication for different devices will be easer. At the same time it collects all the advantages belonging to the previous two types of APPs, such as: original APP and Web APPs. Further positive aspects are: device integration, development costs and timing on average; a *partial* performance mode of operation off-line; distribution on appropriate markets and the following process of approval undertaken by the stores. The present action enhancement requires a Scope statement procedure opened by Calabria Region followed by a Statement of Work for its assignment and execution.
2	Possible changes to the current public policies	This action will be carried out consistently with the current LPT development policy implementing the functions of the current management system.
3	Threads and risk mitigation measures during the implementation process	Final consumer involvement in the Application use → the counter-measure consists in carrying out an effective marketing campaign to motivate citizens to its use highlighting its significant advantages and benefits
4	Stages of the Implementation Plan	The activities are developed according to the following work phases: ➢ Analysis (2 months); ➢ Plan design (2 months); ➢ Implementation (3 months) ➢ Debug/Test (2 months);
5	Responsible Authorities	Calabria Region – UNICAL
6	Actors to be involved	TPL urban and extra-urban companies – Trenitalia – Ferrovie della Calabria
7	Financial resources	Software Development: 102.500 Euros Human Resources: n° 2 Developers, n° 1 Web Designer & User Experience Euros per day for the Developer: 250 Euros Euros per day for the Web Designer & User Experience: 250 Euros
8	Timing and Deadlines	Days/Developer: 180 Days/Web Designer: 50 Total amount of time in days: 100 Total amount fo time in months: 9
9	Monitoring and Control System	The APP must be monitored and controlled in order to remove the faults. New versions of the applications should be therefore made available.
10	Good Practice of reference	AMACO INFOBUS (Cosenza, Italy)

Fig.7 - Logic diagram of the current "Regional System for the Management of LPT Services" integrated with Implementation Plan action II.

> **Action Plan – Best Practice susceptible to be implemented in the long-term.**

	Action III: *Introduction of e-ticketing and implementation of innovative payment systems for intermodal mobility services;*	
	Specific Objective: to encourage intermodality and integration of fares	
1	Description	The introduction of an integrated e-ticketing system proposal based on the best practice "Mi Muovo" aims to foster the final customer's LPT use. Moreover, it has got the purpose of improving the service performances of public and private transport companies. in particular, the operational phases introduced below are flexible and subject to variations. The project object consists in improving the quality of services provided by public transport envisaging integration between different mobility provisions all over the region. The final outcome will be the considerable enhancement of public of transport (bus and trains), combining them with other complementary means of conveyance, like bike sharing and car sharing. The advantages deriving from the adoption of this integrated fare system are the following: • Simplified access to public transport by the users; • Traffic data acknowledgement to facilitate local public transport management; • Appropriate fares to the provided services allowed by more flexible and effective business strategies; • Encouraging service demand and enhancing customer loyalty. The involved stakeholders: ➔ Local Transport company; ➔ Ferrovie della Calabria; ➔ Trenitalia; ➔ Organized commettees and *associations of* citizens. ➔ Trade associations; ➔ Trade Unions.

It should be remarked that the integration of fares during start-up phase can start by paper traditional means meanwhile the appropriate technologies to operate e-ticketing are implemented.

According to the time schedule of the project, at the beginning it could consists in an integrated yearly subscription for bus and train urban routes directed to students and commuters (on paper); then the first chip card applications could be operated - integrating urban train and bus routes in addition to extra-urban train routes – in different areas all over the region.

At a later stage further options could be considered:
- ➜ Release of electronic ticketing (both on-board and on the ground technological device installation; organizational changes; training of personnel, etc.) all over the provinces in the region including Trenitalia railway services;
- ➜ Setting of intermodal integration operational models (stop, etc) based on card use;
- ➜ Implementation of a clearing system among the operators to allocate the revenues and enhancement of the prime experimentations in certain catchment areas
- ➜ Implementation and distribution of multi-channel purchase, renouvation and charge of travel title systems all over the provinces;
- ➜ Institutional marketing campaigns all over the region to promote the opportunities led by e-ticketing system introduction.

E-ticketing will be operated in connection with AVL or AVM systems in real time. Consequently, information about the vehicle location during its journey can be automatically forwarded to the validator preventing the driver's manual intervention. In particular, the introduction of easy to use and legible contactless cards will promote LPT because they could be recharged in shops, or plugged into the self-service machines. Moreover, the customers will be able to charge their e-ticket logging on the Web platform and accessing their personal profile.

The system can be defined integrated because

Il sistema si definisce "integrato" in quanto:
- ➜ The fare corresponds to the route travelled instead of the means of conveyance taken;
- ➜ The ticket is unique to all means of transport available.

The ticket could be:
1. Ordinary standard fare ticket;
2. Reloadable/Rechargeable prepaid ordinary travel card valid for any routes and more than one users.
3. Reloadable/Rechargeable prepaid season ticket valid for a defined travel route granting an additional volume discounts according to the frequency of usage. It also gives access to further single journeys out of the subscriber's use of the services provided pursuant to the travel agreement.

Concerned technologies:
- ➜ Contactless card valid for season tickets and multi-routes fare ticket:
- ➜ disposable magnetic support for ordinary fare ticket.

2	**Possible changes to the current public policies**	This action will be carried out consistently with the current LPT development policy implementing the functions of the current management system.
3	**Threads and risk**	1. Management of consultations among different actors involved.

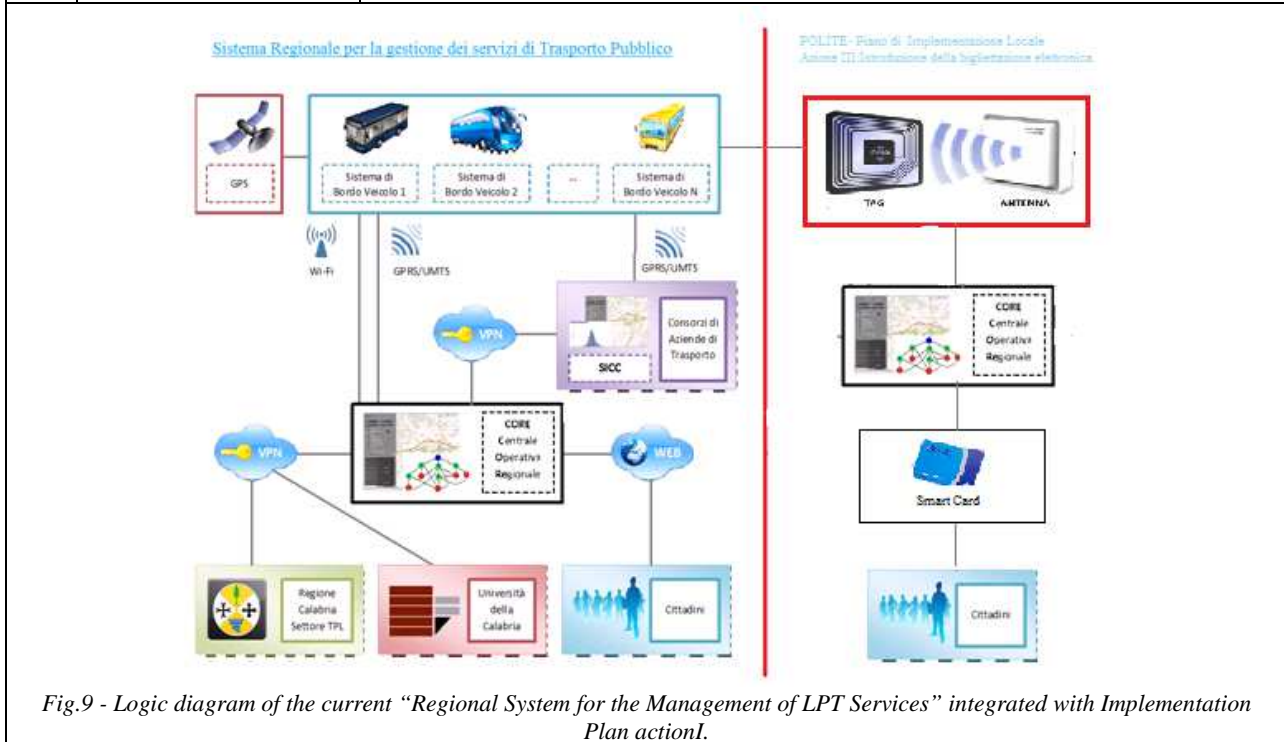|		
	mitigation measures during the implementation process	2. Definition of shared criteria in the definition of rules for the revenue allocation among LPT companies (clearing). 3. Customers' disposition to adapt to the new fare system. 4. Accreditation of an operating structure working as the guarantor of the entire system integrity. 1. Companies main concern is that they can lose their identity/individual image as well as their management/decision-making power according to business choices and fare policy. In order to streamline the integrated electronic ticketing system a centralized structure to manage economic flows and to distribute revenues to each single company properly.
4	**Stages of the Implementation Plan**	**Phase 1 – collection of data required to launch the e-ticketing project** 1.1 *Statutory provisions analyis:* a. license royalties; b. system of subsidies. c. allocation of income deriving from fare revenues. 1.2 *Investigation into the selected geographical area:* a. public transport network present-day situation. b. ticketing system present-day situation. c. present-day situation of urban/extra-urban mobility policy. d. Extended connections to the regional and national railway networks. e. present-day situation of the systems operated by the various local stakeholders. 1.3 *Behavioural analysis and market research to identify customers' needs.* a. travelling habits. b. different means of transport perception c. customer's satisfaction d. use of especially featured categories of tickets. e. research and selection of possible applications for any different ticket type. 1.4 *Customers' special needs analysis:* a. Source model and *target m*odel analysis. b. specific groups of consumers' needs (the elderly, persons of reduced mobility, special needs' people). 1.5 Efficient pricing upgraded analysis. 1.6 *Ticket payment and emission systems upgraded analysis.* 1.7 *Collection of previous experiences in integrated e-ticketing carried out in cities/areas that can be compared to the case study.* 1.8 *Analysis of the actual level of literacy regarding available IT devices, the knowledge of the managerial organization structures, as well as the stakeholders to be involved.* 1.9 *Sustainable founding plan analysis to implement, operate and maintain the service.* 1.10 *Assessment of the present-day situation regarding the transport system IT infrastructure.* **Phase 2 – Formal decisions to implement the integrated ticketing project.** 2.1 *Agreements regarding a system of joined and shared practices operated by the entirety of the transport stakeholders, according to:* a. financial contributions supplied by the operators; b. the consecutive distribution of the revenues. 2.2 *Consultation on deciding whether the participating operators will correspond a commission form the beginning of the project or after a certain period of time from its execution.* 2.3 *Selection of new technologies to be operated.* 2.4 *Partnership regarding smart card usage as well as the other project objectives (museum entrance, sport activities and entertainment, etc.).*

    2.5 *Partnership regarding a unique and integrated multimodal and multi-opertor IT system use.*

    2.6 *Partnership appointing a subject (or a team) to be responsible for the implementation of the project.*

Phase 3 – Integrated e-ticketing system design.

    3.1 *Definition of ticket types;*

    3.2 *Definition of fares;*

    3.3 *Definition of the general conditions of availability, registration, payment, and collection of the tickets – Ticket type choice (paper/electronic ticket).*

    3.4 *Definition of monitoring and management strategies.*

    3.5 *Selection of further services to provide in addition within the system (e.g. car sharing, bike-sharing, parking, etc).*

    3.6 *Definition of technical and functional specifications for an integrated IT system.*

    3.7 *To determine the type and format of information to supply.*

    3.8 *To select the locations and methods of information delivery.*

Phase 4 – Call for tenders for the integrated e-ticketing system implementation

    4.1 *To issue a call for tenders to appoint the Managing Authority responsible for the system.*

    4.2 *To issue a call for tenders to appoint the experts in charge of the project implementation and the provision of services regarding the integrated ticketing facility.*

    4.3 *To issue a call for tenders to appoint the experts in charge of the development and provision of the new integrated IT services.*

Phase 5 – Implementation and installation of the integrated e-ticketing.

    5.1 *Centralized management to integrate operations of ticket sales server with fare definition and/or the management of other transport stakeholders.*

    5.2 *Adoption of internet operating software – for smart card subscription on-line -.*

    5.3 *Production and distribution of the equipment (electronic ticketing, contactless ticket punches, etc.).*

    5.4 *System place into service and testing (on a smaller scale), system installation (on a larger scale).*

Phase 6 – New integrated e-ticketing services promotion and its advantages.

    6.1 *Definition of the criteria regarding the new integrated e-ticketing services.*

    6.2 *Definition of the criteria regarding the new integrated IT services.*

    6.3 *Marketing campaign implementation.*

Phase 7 – Assessment and monitoring of the new integrated e-ticketing service.

    7.1 *Monitoring of collected data reliability and precision.*

    7.2 *Monitoring of the installed system costs and benefits comparing them to the results reported in a case study where the implementation of the same measure failed.*

    7.3 *Evaluation of customer's satisfaction.*

#		
5	**Responsible Authorities**	Calabria Region – UNICAL
6	**Actors to be involved**	TPL urban and extra-urban companies – Trenitalia – Ferrovie della Calabria
7	**Auxiliary equipment installation**	In order to implement the system the following equipment should be installed: a. Adjustment of the CORE system in order to make available central sub-systems – concerning any company/Managing Authority singularly – to manage the ticketing system to its full capacity. b. Hybrid ticket punches/bus and train contactless ticket punches on board. c. Hybrid ticket punches/contactless ticket punches at the stations. d. Over-the-counter recharging devices in tobacconists and newsagents. e. Company ticket offices to sell tickets. f. Handheld devices to check tickets.

8	**Financial Resources/Costs**	Costs vary greatly according to the type of system operated, the number of contactless ticket punches, centralized ticketing management system and the number of vehicles to be equipped with new technological devices. We should therefore take into consideration the following categories of costs: • New ticketing system determination and development costs: • centralized ticketing management system hardware and software costs: • vehicle auxiliary equipment, stops and stations (aerials, customized *Electronic Ticketing Machines,* ticket punches, etc.); • Monitoring system development costs. Feasibility study costs: Euros per day for n° 1 Project Manager: 250 Euros Euros per day for n° 1 Functional Analyst: 250 Euros Days/Project Manager: 100 Days/Functional Analyst: 100 Total amount of time in days: 100 Total amount of time in moths: 5 Total Cost: Euros 50.000,00
9	**Good Practice of reference**	MI MUOVO (Emilia-Romagna Region)

Fig.9 - Logic diagram of the current "Regional System for the Management of LPT Services" integrated with Implementation Plan actionI.

	Action IV: Info-mobility system development for the introduction of *added-value services* for the tourism industry and the local marketing enhancement	
	Specific Objective: to encourage the provision of public transport services adapted to the flexible needs of specific users' categories.	
1	Description	One of the most accredited potential of CORE system consists in the management of the whole territory of Calabria region supplying further added-value services. The pivotal asset is certainly the tourism industry. According to tourism, local areas management by the use of info-mobility allows:

> Tourist industry services provision, in particular regarding their networking community, local cultural heritage display and consumption by means of new technology; integrated thematic virtual experiences developed to increase tourism in marginal areas because localized far from major streams of tourist traffic. For example, information regarding hospitality, local services, multimedia tourist guide, positioning facilities, navigation and travel arrangements could be made available on the mobile phone;

> Tourist destination attractiveness should enhance capacity of the whole production chain operated by innovative service supply strategies which encourage the a leverage effect on the entire territorial economy;

> The exercise of new technologies to manage and organize tourism should be consistent with local citizens' high standard of living;

> Implementing an integrated platform of communication regarding tourism services.

Developing a competitive knowledge-based economic framework aiming at the integration of tourism industry and the local marketing enhancement should generally begin with a systematic search of information regarding natural, historical, cultural resources, as well as traditional local productions of food and drinks, on one hand; on the other it should classify both infrastructural and accommodating assets which can satisfy the most complex diversified target demands. In the light of the above mentioned background effective measures can be outlined to improve the encounter between service supply on the territory and the different market segments demand. The objectives to be achieved according to knowledge content, enhancement, integration and promotion of Calabria territory can be pursued by the establishment of a geo-database useful for the organization and classification of expertise to implement thematic sections, like the environmental unit (protected areas, natural reserves, flora and fauna, etc.), the division regarding the local cultural identity (fortifications, churches, old town centres, etc.). They can be accessed by an on-line platform that, whether equipped with a module which allows contributions from the community of users, can be improved in the quality, dynamism and attractiveness of the services it provides. The communicative impact of a digital system of information is meaningfully augmented by the possibility of high resolution images integration delivered low cost by both aerial survey platform and satellite. In addition to them the informative scheme could take advantage of video reports about topographic surveys and 3D models obtained by laserscanner acquisition methods. Finally, dedicated resources devised for mobile appliances like APPs and Augmented Reality software can promote the dissemination and replication of the information and the innovative resources supplied on-line by the system.

In particular, this Web platform will be integrated with CORE platform providing added-value IT services; it will be considered as the regional marketplace for tourism facilities because it enhances a win-win strategy enacted by Calabria Region Institution and the local stakeholders working in the sectors of tourism industry and production in Calabria.

Tourism professionals – accommodation and food and catering business operators, in addition to museums and tour agencies – will be able to ameliorate their digital profile and attractiveness raising their profits accordingly. The utilities provided have been grouped in package services:

➔ Free services: basic services
1. Spotlight website on internet and mobile devices
2. Social network profile
3. Geo-location service.
4. basic CMS module

		→ Premium services: business developmental utilities (providing a yearly subscription) 　　1. Business CMS module 　　2. Booking service 　　3. Review service 　　4. Personalized advertising service according to the final user's profile 　　5. Social media marketing ad hoc service → Custom Services: personalized services on the vertical market according to the tourist operator's digital needs (providing a yearly subscription in addition to further extra-costs calculated on the basis of the added-value services to be provided). A Managing Authority will be appointed; it will consist in a previously existing Calabria Region in-house company, which will be in charge of the following tasks: management of the phase of analysis, design, development, and subsequent launch of the project, in addition to the monitoring and direction of the project itself. The Managing Authority will have a corporate legal identity envisaging enough profit to support the human resource division intended by the plan. The present action enhancement requires a Scope statement procedure opened by Calabria Region followed by a Statement of Work for its assignment and execution.
2	Possible changes to the current public policies	This action will be carried out consistently with the current LPT development policy implementing the functions of the current management system.
3	Threads and risk mitigation measures during the implementation process	Any remarkable critical problems are envisaged
4	Stages of the Implementation Plan	The activities are developed according to the following work phases: ➢ Analysis; ➢ Plan design; ➢ Implementation; ➢ Debug/Test ➢ Experimentation; ➢ Dissemination. In line with the Experimentation phase, the commercial launch of the project will be enhanced simultaneously, together with the Social e Digital Marketing activity. In particular, referring to the Digital e Social Media Marketing action, the following activities have been planned: ➢ Briefing and further meetings to define objectives and target users; ➢ Strategy definition; ➢ Definition of the editorial plan, editorial time schedule diversified according to the social-digital marketing channel; ➢ Purposeful devised operational actions for the social-digital marketing channel, which are consistent with the editorial strategy and guidelines at the same time; ➢ Performance analysis and monitoring; ➢ Strategy, plans, and actions streamlining to attain objectives and targets successfully; ➢ Supporting activity to management and streamlining of social marketing channels.
5	Responsible Authorities	Calabria Region – UNICAL – Manging Authority (e.g. previously existing Calabria Region in-house company)

| 6	Actors to be involved	Public and private stakeholders working in the sectors of tourism industry and production in Calabria.
7	**Financial resources**	Software Development: Euros Human Resources: n° 2 Developers, n° 1 Web Designer, n° 2 Social Media Managers, n° 1 Business Manager. Euros/day per Developer: 250 Euros Euros/day per Web Designer: 200 Euros Euros/day per Social Media Manager: 200 Euros Euros/day per Business Manager: Euros 250
8	**Timing and Deadlines**	Developer daily budget: 120 Web Designer daily budget: 20 Social Media Manager daily budget: 120 + "work in progress" Business Manager daily budget: 120 + "work in progress" Total amount of time in days: 120 Total amount of time in months: 6
9	**Total amount of Financial resources**	Developer daily budget: Euros 250 6 months total budget: Euros 142.000,00 Operating costs and maintenance of the services provided will be supported by the Managing Authority corporate organization revenues.
10	**Monitoring and Control System**	Azione già prevista sia per lo sviluppo del progetto digitale sia per il piano di digital e social media marketing, nonché per la gestione ed upgrade le progetto direttamente dal Soggetto Gestore
11	**Best Practice of reference**	MOBILITAMI/My Cicero (Marche Region)
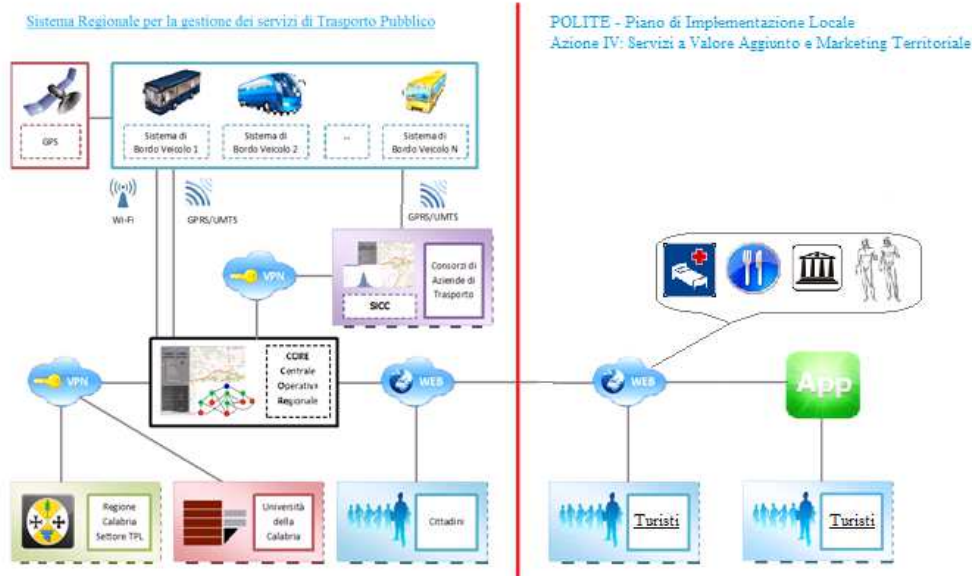
Fig.9 - Logic diagram of the current "Regional System for the Management of LPT Services" integrated with Implementation Plan action V.

8. ## Strategic planning and resource development

➤ **Workplan**

| Action	Description	Coordiantor	Stakeholders	Deliverrable deadline	Costs Estimates
A1	Current on-road LPT facilities integration with rail LPT system	Regione Calabria	Unical Trenitalia Ferrovie della Calabria	**6 Months**	**Euros 200.000,00**
A2	Optimization of CORE and infomobility services	Regione Calabria	Unical	**7 Months**	**Euros 102.500,00**
A3	Introduction of e-ticketing and implementation of innovative payment systems for intermodal mobility services	Regione Calabria	Urban Transport Companies Ferrovie della Calabria Trenitalia	**5 Months***	**Euros 50.000,00***
A4	Info-mobility system development for the introduction of *added-value services* for the tourism industry and the local marketing enhancement	Regione Calabria	Regione Calabria UNICAL Managing Authority	**6 Months**	**Euros 142.000,00**

*Implementation costs and time schedule refer to the feasibility study.

➤ **Time chart of the activities**

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	2014 (quarter)				2015 (quarter)				2016 (quarter)				2017 (quarter)			
	I°.	II°	III°	IV°	I°.	II°	III°	IV°	I°.	II°	III°	IV°	I°.	II°	III°	IV°
A1					🟨	⬛	⬛									
A2					🟨	⬛	⬛	⬛								
A3*							🟨	⬛	⬛	⬛						
A4								🟨	⬛	⬛						

* This time schedule refers to the feasibility study.
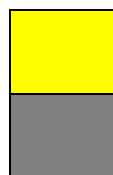
🟨   **Administrative procedures schedule.**

⬛   **Actions schedule.**

9. POLITE Project quality indicators

Regarding knowledge-transfer successful process from selected Best Practices

In the course of POLITE project implementation the overall transport system in Calabria has undertaken a progress enhanced by ITS operation procedure. Within the more general context of initiatives fostered by the "Observatory on Urban Mobility", established by Regional Decree with the force of law n. 23/1999, Calabria Region has signed an agreement with the University of Calabria (UNICAL) to devise, and coordinate a regional system for the management of local public transport services.

The above mentioned concurrence will manage to accomplish its main goals as listed below:

➢ Certification of LPT services provided by the Managing Authorities entrusted with the above mentioned remit;

➢ provision of info-mobility services to users locally*;*

➢ supporting services to transport managing LPT companies in order to improve their effectiveness and efficiency;

➢ data analysis of service performance.

The proposed infrastructure, which specific main characteristics and component elements in terms of hardware, software and services provided - addressing to its scalability criteria - will be suitable to be easily resized, and completed to arrange additional facilities. In this respect, reference is made to some of them:

➢ a regionally integrated automatic ticketing system;

➢ innovative provisions for passengers transport system and intermodality;

➢ developed integrated resources to comprise tourism industry services.

According to the second phase of the project, knowledge-transfer would have been enhanced from four distinguished Best Practices selected among thirty of them within the POLITE project activities; they are respectively: MULTIMODAL PLANNER "IDOS" (CZECH REPUBLIC);MI MUOVO PROJECT (ITALY- Emilia-Romagna region); TRAVELLER INFOBUS (ITALY – City of Cosenza); MyCicero (ITALY – Marche region). Their success was considered a blueprint to amend and integrate the current "regional management system of Local Public Transport Services in Calabria".

Local capacity-building enforced official documents and policies

During POLITE project implementation, Calabria Region institution has been editing the Regional Transport Plan, whose "Regional Transport Scheme guidelines" (available at

www.calabriatrasporti.it) were granted by the Regional Decree with the force of law n. 286 of the 5th August 2013 addressing the RTP strategic actions to accomplish the following main three general objectives: Respecting the principles of social sustainability, Respecting the principles of environmental sustainability, Respecting the principles of economic sustainability.

The primary objective of this project is to implement an action plan for public transport system sustainable development in Calabria in 2014-2020 period, taking into consideration conceivable renovations expected as far as 2030.

The greatest challenge that has to be faced by the local politicians is to affect the generalized local mindset regarding the indispensable need of a car for travelling. An appealing transport network of a vast variety of comfortable routes which offer a fast, punctual and safe service will be in a position to change people's habits as regards driving, vehicle use and travel.

In this regard, a further final goal to be achieved by POLITE project is to enhance the regional Transport Master Plan especially concerning the ITS section. Furthermore, the local Implementation Plan developed within the POLITE project activities will corroborate the ITS (Intelligent Transport Systems) Executive Plans in order to: *"to encourage the use of innovative technology solutions that enable the increase of the degree of efficiency and quality of public transport service and that will increase the accessibility of the service and the passenger intermodality in order to make the public transport service competitive, at different territorial levels, compared to private transport "*

The present Implementation Plan dovetails with the collection of experiences gathered within POLITE project. This document serves: on one hand, to propose guidelines of action for the local administrative divisions and the regional Institutions; on the other, it undertakes the task to determine the operational objectives, the activities to be carried out, in addition to define the financial resources and timing for the successful implementation of ITS measures.

The general objective of this Local Implementation Plan is *"to encourage the use of innovative technology solutions that enable the increase of the degree of efficiency and quality of public transport service and that will increase the accessibility of the service and the passenger intermodality in order to make the public transport service competitive, at different territorial levels, compared to private transport "*

Consequently, Calabria Region has devised a series of actions which can be acknowledged to pursue this aim. To establish the Implemmetation Plan operational objectives it was relevant to examine previous experiences, such as: MULTIMODAL PLANNER "IDOS" (CZECH REPUBLIC), MI MUOVO PROJECT (ITALY), TRAVELLER INFOBUS (ITALY) e MYCICERO. The knowledge-transfer activity enhanced has fostered the process of appointing the actions for integrating and amending the current "regional management system of Local Public Transport Services in Calabria".

The preset Plan is made up of the following short-term achievable actions (undertaken in a maximum of 1-year time frame):

- Current operational facilities integration with other transport systems,

- Optimization of CORE and infomobility services.

Besides, strategic actions to be attained in the long term (a maximum of 3-year time frame) are:

- Introduction of e-ticketing and implementation of innovative payment systems for intermodal mobility services*;*

- Info-mobility system development for the introduction of *added-value services* for the tourism industry and the local marketing enhancement.

The greatest challenges to the effective application of the present Implementation Plan are related to the committed actors awareness of the issues involved - public and private transport companies – as well as sufficient financial resources to cover the costs of the above mentioned actions.

The final outcome of POLITE project is to enhance the regional Transport Master Plan concerning ITS. Furthermore, the local Implementation Plan will corroborate the ITS

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(Intelligent Transport Systems) Executive Plans.