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The Pivotal Role of Public Transport in Designing the Integration of Mobility Services and in Operating MaaS Offer: the Concept of Shared Mobility Centre and the Experience of Arezzo

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1 ABSTRACT

The paper identifies the emerging trends and requirements in the mobility demand and the gaps between them and the offer. The paper shows how Public Authorities and Mobility Operators should provide a seamless mobility offer able to answer to mobility demand which is becoming more flexible and varied in typologies and needs. Public Transport must be the backbone of this integrated mobility offer including conventional services for main urban axes/corridors and FTS/ridesharing services for feeder, last mile and target groups services. ITS for Public Transport are the base systems to provide MaaS and Public Transport Operators should leader MaaS initiatives. Central role in the MaaS initiative must be allocated to Shared Mobility Centre as "umbrella" platform/organization able to coordinate conventional different transport services in a seamless mobility offer (from planning to operation to back-office functionalities interesting both Operators and Authorities). The experience of MaaS activated/under development in the city of Arezzo will be the opportunity to highlight some critical factors that must be guaranteed as supporting actions for MaaS.

2 CURRENT URBAN MOBILITY CHALLENGES IN EUROPE

In this section the main relevant urban mobility challenges are identified in terms of gaps between the current mobility demand requirements and new emerging trend, on one side, and the features of current mobility offer, on the other. The analysis carried out at European level show that old and new challenges continue to afflict the mobility field: unsolved and "well known" problems as traffic congestion and pollution are still on the ground, added to this, in recent years and even more in the future, urban mobility is substantially changing due to emerging societal trends and new demand which is becoming more and more differentiated in terms of users segmentation and needs. Outcomes from the analysis carried out in the following sections can be found also at European policies level [1],[2], [3], [4].

2.1 Current urban mobility trends on demand side

Cities in Europe continue to grow. Currently, over 74% of EU-28 citizens live in urban areas, a proportion expected to exceed 80% by 2030 [5]. This creates challenges for policy makers and transport stakeholders, in terms of mobility, city accessibility and connection from the centre to/from neighbourhoods but also health and quality of life. Data collected in the most relevant mobility surveys around Europe show that "well known" challenges as traffic congestion and pollution are still unsolved problems in the urban areas. Main factors identified by national ([6], [7]) and cross-national surveys are the following ones. The private cars use is still the largely dominant mobility modalities in urban areas (an average of 70-80% of the total commuter trips are carried out by cars at EU level, more than 650 cars each 1000 inhabitants are registered in Italy, …). The use of private cars is still dominant for covering small distances (50% of the trips carried out by car are under 5 Km, 25% under 2 Km, …) and it is still affected by poor occupancy rate (85%-90% of the vehicles have 1.2 occupants). Traffic congestion is a negative experience daily tested moving in our cities and it affects mostly the medium-small urban areas (most of them constituting of historical centres with limited accessibility and narrow streets) which represent the largest part of cities in EU (where 1364 cities are between 40000 and 200000 inhabitants). Air and noise pollution continue to cause serious health impacts, particularly in urban areas, and are expected to worsen: as example we can refer to the repeated cases of overcoming of pollution thresholds in various Italian towns (Milan, Rome, Naples …) in December 2015 and following temporary circulation restrictions.

Furthermore the mobility demand is becoming more and more flexible in terms of users segmentation and needs, use of transport mode, time of use. People are always on the move (work, social education, pleasure, health…). Smartphones, internet and social media channels are transforming the traditional mobility concepts which were based on the differentiation of users segmentation and transport modes in a similar way

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to the transformation of the access and use modalities of a large part of personal, community and public services. “Virtual mobility” is the emerging concept pushed by citizens aiming to consider mobility services as a seamless offer in terms of comodality, integrated access, payment and use of services without matter of the mode and the operator. Users ask to be more flexible in choosing their transport modes, even day by day or trip by trip but not being penalized in terms of accessibility, information and tariff schemes. Moreover the increased flexibility on demand side lead to the request of tailored and customized service to suit niche groups and individual needs. Another emerging trend which is becoming more and more significant in USA but also in Europe (especially among the young generations as millenials) consists of the increased preference of ridesharing services whereas the possession of a car is largely decreasing. This follow the general transition from ownership to sharing concept: the car is not seen as a “status symbol” as years before and the possession of the driving license itself is not more considered a priority among younger generation being postponed. This trend have been analyzed by some H2020 European projects as CIPTEC [10] and MINDSET [11].

On one hand, these mobility trends could probably change the approach for car use in the future: on the other, for sure, they have already pushed the growing of alternative ride sharing schemes.

2.2 The state of art of mobility offer

The mobility offer has not been still fully able to answer to the “well know” problems and emerging trends described in section 2.1.

Even if relevant achievements have been accomplished in terms of the integration of data and end-users services (multimodal real-time info, interoperable payment tools) among different operators and ITS, standardization, etc., the mobility offer is still largely fragmented in terms of ticketing, info, marketing and accessibility. Historically the mobility sector is customized to a “classification view” on services, transport modes and users segmentation but currently the traditional contrast between collective and individual transport solutions is gradually blurring. More than this there is a lack of validated private-public collaboration schemes and business models across Europe: collaboration between mobility operators is hardly to be achieved, no consolidated institutional and regulatory framework has been developed at national level, commercial agreements required to integrate the offer in terms of tariff schemes and payment tools are deeply affect by the conflicting needs among the Operators in the management of accountability of the revenue. At the same time, Authorities are not able to promote attractive integrated mobility solutions and to develop effective sustainable mobility policy and plans involving all market stakeholders.

The mobility offer has been demonstrated to be still ineffective in providing integrated solutions able to comply with the current challenges and the emerging needs and requirements.

3 EMERGING RIDESHARING SERVICES

Public Authorities (Municipalities, Mobility and Public Transport Agencies, etc.) have been very interested in the uptake of ridesharing services but considering them as a substituting solution for Public Transport than an integration at it could be. This inappropriate approach took place in particular in medium and small cities and in the context (as in Italy) where budget cut to public financing affected the Public Transport services.

Ridesharing services cover a wide range of flexible and intermediate individual and collective transport modes: from well established schemes as bike and car sharing to collective taxi and car pooling, from dynamic ridesharing services to peer-to-peer transport schemes and new forms of “institutionalized hitchhiking". Ridesharing schemes are pushed by the mobility trends described in section 2.1 and they have been until now successfully deployed mainly by commercial operators who apply the available technologies (smartphone, web access, ICT platform) and innovative marketing and business approaches to service schemes which were already been developed and introduced.

From the service point of view, the models promoted by ridesharing services are not new as they are a replication of the well known DRT or Flexible services concepts which have been already implemented from '90 by initiative of Public Transport Operators and Authorities. In particular, Flexible Transport Services (FTS) can be defined as a transport service which is adapted for meeting users needs, typically on a trip-by-trip basis with a certain level of flexibility on three operational dimensions (routing, timing of the service, vehicle used) in order to enhance service offer and minimize costs in response to demand. FTS include a

larger range of services and schemes, such as: general use and feeder services, local and feeder services to trunk haul services, replacement of low-frequency conventional services, replacement of fixed routes in evenings, weekends and other low-demand periods, dedicated/special services restricted to specific users groups, services in low-density rural areas, efficiencies in social mobility resources, niche urban markets, fuzzy lines between small buses and big taxis, etc. These different operational schemes have been validated and evaluated from the feasibility and technology aspects to the organization and business models in several EU projects (SAMPO, SAMPLUS, FAMS, CONNECT, FLIPPER [8], …) and real applications, with different results. Some of the experiences were successful, some other partially; anyway later DRTs were the first victim of the economic crisis affecting in particular some EU countries as they have not come up with a consolidated business model and performances indicators (especially for including them as part of the tender and contracting of Public Transport services). Also the technologies available in '90 (GSM/GPRS communication network, on-board devices) were not performing enough compared to the "advanced" service schemes they should support.

4 ROLE OF PUBLIC TRANSPORT IN THE OVERALL URBAN MOBILITY OFFER

4.1 Role and measures in Public Transport

Considering that bus services are the primary form of public transport in European cities (conventional bus services globally represent the largest part - between 50% - 80% - of the whole PT offer and this situation will last in the short and medium future despite the current trends on the mobility), it is evident that the adoption of any effective mobility solution must include Public Transport as key component. Buses have a very high efficiency potential: in fact one single bus carries the equivalent of 60 cars, consumes 3 to 5 times less energy per passenger, creates 11 times less noise and reduces serious injuries and fatalities from 10 to 20 times then buses are a cost-efficient transport means for passengers. On the other hand other ridesharing services cannot be considered "win-to-win" solutions tackling all the problems: for example, an electrical fleet for car sharing operation allows to achieve large impacts in environmental pollution and emissions but limited for traffic congestion, the extensive use of bikes is not "zero emissions" as the bikes circulation and lanes construction impact on other transport modalities.

In order to improve its quality and to gain market potential towards the citizens, the measures implemented in conventional Public Transport are ([2], [4]): implementation of BHLS (Bus High Level Services, [9]), integration of services both for planning and for operation, interoperability of fare and payment tools, improved accessibility both physically than for info access. Horizontally to these measures, technological investments and operational and organizational efforts have been assured by Public Transport Operators and Authorities to optimize the control of bus service quality and performances (also under a unitary approach when services are operated by different Operators on the network). A key role for guaranteeing the service quality is assured by the operation of AVM Fleet Monitoring System not only for the functionalities it enables but also for the operation of ancillary systems (e-ticketing, infomobility, surveillance, …).

4.2 Challenges for Public Transport

Despite its relevant role in the mobility offer, the Public Transport has been one of the public services mostly affected by budget cut due to public financing constraints (i.e. in Italy). As a result the Public Transport is not able to overcome its "Cinderella" position in particular in the medium and small urban areas where Public Transport potentials are affected by poor image, unreliability and low performances. Despite this, however, over the past fifty years the operating conditions for buses have deteriorated. As buses have become caught in congestion, the quality, reliability, ridership and image of the bus has also deteriorated. This lack of efficient public transport services (both in quality and in quantity) forces many European citizens to use private vehicles for their trips (even short-range in urban areas). This vicious circle must be broken, not only to improve urban mobility, but also to enhance overall city liveability, to reduce pollution and emissions and to promote social inclusion.

5 REPOSITIONING AND REQUALIFICATION OF PUBLIC TRANSPORT IN A INTEGRATED MOBILITY OFFER

The experiences of most advanced cities and towns in the world highlight that we cannot achieve sustainable urban mobility without an efficient, extensive and accessible collective transport system. Across urban areas

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it is clear that robust and efficient mobility solutions, well integrated with the conventional Public Transport services that can help overcome the barriers described in section 2 and improve living conditions and environmental quality of towns are required. Implementing innovative measures to break the downward spiral, by increasing the quality of bus services and strengthening the efficiency of newly emerging mobility schemes, cannot be delayed further. Emerging ridesharing services must be considered as part of the wider range of FTS (Flexible Transport Services) and planned as integration of the "backbone" services provided by conventional Public Transport [12].

5.1 Restructuring Public Transport services: acting on planning side

Public Transport stakeholders must be able to take again the leadership on ridesharing services in order to operate them as option of DRT or Flexible schemes. Conventional Public Transport and DRT/Flexible services (including ridesharing services) must be planned under a coordinated approach in order to design an integrated mobility offer. Conventional Public Transport should serve main axes and corridors, DRT/Flexible and ridesharing services should be reserved for last miles and feeders services including, among the others, niche solutions for low demand area, weak time period, target groups, added value services, etc.

The integration between conventional and DRT/Flexible services (including ridesharing services) must be specifically designed site per site: in the same way the identification of the most promising Flexible/Ridesharing services to be considered (on which scale, on which area, …) must be tailored for each city context.

5.2 Towards the MaaS concept: acting on the service operation

From the service operation point of view, this new integrated offer must be supported by the implementation of MaaS concept in order to solve the current fragmentation in terms of ticketing, info, marketing, accessibility and cooperation among different mobility services and operators.

E-ticketing, AVM and User information systems are the base systems for any MaaS (Mobility as a Service) concept implementation. Usually, in Europe, these systems are designed, contracted and operated under responsibility of Public Transport Operators or Agencies. Many times these systems are extended (mainly smart cards) to other services and rarely they are planned under a "city approach". These systems are often designed separately and their integration must be carried out on a "bottom up" approach.

The role of Public Transport Operators/Agencies is fundamental in MaaS as Public Transport services are the backbone in terms of data and services providers, responsible for system's operation and management and responsibility for assuring the quality and reliability of services and data MaaS offer is built on.

Indeed MaaS initiatives must strongly involve the Public Transport Operators/Agencies.

5.3 Towards the MaaS concept: acting on operational and organizational issues

In the section 4 we anticipated that any high quality MaaS services will be possible without an efficient and integrated mobility services offer (based on the backbone role of Public Transport) and without the certification of the quality of data provided by the base-level ITS.

The operation of a wide range of ITS dealing with MaaS offer must guarantee the monitoring of system performances and the provision of reliable services and data. In order to achieve this objectives ITS must be operated with a strong organization structure and proper operational procedures: suitable data certification procedures are required and high quality data must be assured by each Operator on the basis of contract prescriptions and related rules which should be issued by the coordinator of MaaS initiative.

6 TOWARDS THE SHARED MOBILITY CENTRE

The approach proposed in this paper focuses on the need to reconcile and enhance the two parallel axes of urban mobility (collective transport and flexible/ridesharing services) by testing and demonstrating different innovative mobility solutions to be integrated under the "umbrella" of the Shared Mobility Centre for planning and managing the different transport services. The Shared Mobility Centre [13] addresses the two main levels of urban mobility in a coordinated way, where both public (collective) and private components interact with each other: major transport axes and corridors, on the one hand, and flexible/ridesharing

services on the other. Fostering the interaction between public and private mobility through various connected mobility schemes (parking, P+R, interchange facilities with shared vehicles schemes, integrated payment, etc.) is pivotal for improving urban mobility as a whole. To achieve seamless integration between collective and shared mobility the Shared Mobility Centre works on three interrelated levels (collective transport, personal mobility and connected systems). The Shared Mobility Centre will offer integrated access to several "on demand and shared" individual and collective services, by coordinated management of the various actors and services through an ad-hoc organization framework, technology-enabled services and soft measures.

Enabling technological component for the Shared Mobility Centre is an ICT infrastructure, based on the emerging paradigm of the Internet of Services, provide several core facilities including: (1) services for transport users (Business-to-Consumer (B2C) services) enabling access to information, search for transport options, travel planning, booking, ticketing; (2) services for the co-ordination of different transport and mobility schemes and the interaction with the relevant operators (Business-to-Business (B2B) services); (3) services supporting the interactions among different authorities and entities involved in the control of transport services (Business-to-Administration (B2A) services).

Figure 1 offers a first outline of the conceptual architecture for the Shared Use Mobility Centre.

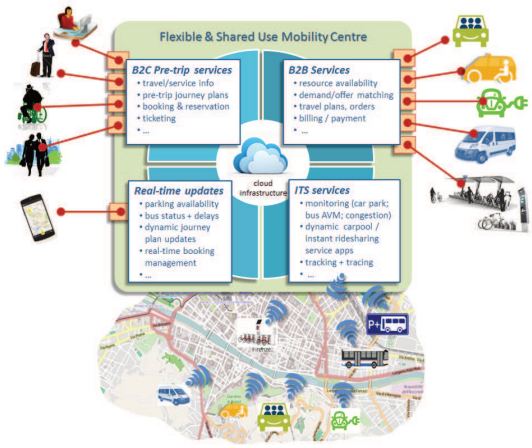

Fig. 1: Conceptual architecture for the Shared Use Mobility Centre

The core concept of the Shared Mobility Centre must be adapted to local policy objectives, stakeholder requirements, users needs and mobility market opportunities, leading to local implementations coordinating a range of different measures.

7 EXAMPLE OF MAAS SERVICES IMPLEMENTATION IN AREZZO

Arezzo is a medium size historic town located in the western area of Tuscany Region (about 75 km far from Florence near the A1 motorway direction Rome). The inhabitants are about 100.000 within the Municipality boundaries (380 Km2) but the inner urban area is even more reduced both in terms of population (about 70.000-80.000) and area. As all the historical medium and small cities, Arezzo is affected by the poor accessibility of city centre, the traffic congestion, the low number of free parking lots, the management of tourist flows and peak demand. In order to face these challenges in the last years different measures took place: investment in infrastructures (new parking, cycling lanes), new services (bike sharing, car sharing) and implementation of a wide range of ITS solutions: for traffic (access control, traffic flow counting system sensors, VMS for guidance to free parking lots and visualization of news on traffic, road work and mobility events, Parking Management System, smart park meters, etc.) and for transport (AVM, e-ticketing). More recently the Public Authorities and the Mobility (ATAM) and Transport (Tiemme) Operators have committed to better integrate the mobility services and supporting ITS in a more integrated offer. In this section the paper will detail two of the main MaaS initiatives developed in Arezzo: the integration of the access and payment of the mobility and transport services based on an interoperable contactless smart card (Arezzo Card) and the integration of data provided by different sources and ITS in order to provide multimodal integrated infoservices. The following sections will present the main achievements of the abovementioned MaaS initiatives developed in Arezzo.

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7.1 Arezzo Card: the interoperable payment system in Arezzo

The following mobility services are currently accessible through Arezzo Card:

- Public Transport services (n.20 lines, n.50 buses) with with e-ticketing system provided by AEP Ticketing Solutions and activated in 2013;
- On-street parking service (65 smart park meters, about 1500 parking lots) provided by Parkeon operated through "proprietary" magnetic cards up to 2013 and updated to Arezzo card in 2013;
- House parking service (centralized through a PMS connecting n.3 house parking) provided by Designa operated through "proprietary" magnetic cards up to 2014 and updated to Arezzo card since the beginning 2015;
- Bike sharing system provided by Bicincittà (main Italian provider of bike sharing systems) operated through "proprietary" MiFare smart cards up to 2013 and updated to Arezzo card in 2013;
- Car sharing system provided by TRS (main Italian provider of car sharing systems, for front-end modules) and CART (Italian sw development and integration company, for back office and accounting modules) operated since June 2015 through Arezzo card.

Arezzo Card is an example of “bottom-up” approach to integration as any specification has been not defined at regional or city level.

7.1.1 Arezzo Card functionalities and operational scenario

Smart cards are emitted in a Ticket Point which sells tickets (contracts) both for Tiemme (Public Transport) and ATAM (parking, bike sharing, car sharing). Ticket Point performs also the enabling operations to allow the user to access different services (assigning the required user profile).

Integrated payment system in Arezzo enables the following operational scenarios:

- the access to PT urban services with personal subscriptions and multi-trips tickets. Recharge of PT tickets is managed by Ticket Point;
- the purchase of single trip urban tickets (for one or more passengers) to be carried out on-board at validators by e-purse credit;
- the access to parking services with contracts related to vehicle plat. Renewal of parking contracts is available both at Ticket Points and at on-street payment device or at automatic payment machines in off-street parking;
- the payment of hour tariff both for on-street and house parking by the e-purse credit;
- the access to bike sharing and car sharing services for the pick up and return operations.

The tariff scheme managed by Arezzo Card includes policies and promotional incentives fostering the use of Public Transport and the P&R services: for example, for Public Transport, the application of a monthly free pass (flax rate) if the user has purchased n.30 on board single-trip tickets with e-purse credit over the month.

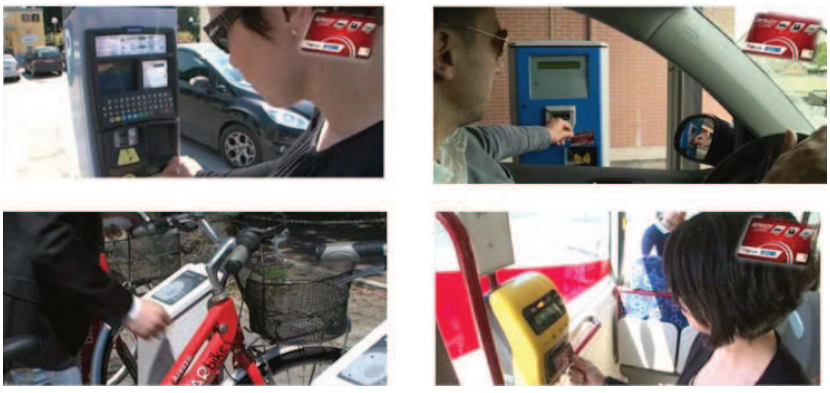

Fig. 2: Use cases of Arezzo Card

Figure 2 shows main uses cases of Arezzo card.

7.1.2 Cards specifications

Interoperable smart cards used in Arezzo comply with "Calypso" – release 2.4 operative system specifications (please see Calypso Network Association site for more information). Arezzo card is a multi-application smart card providing dedicated application (card data area) for each service and a common e-purse application. Each service application stores data profile of the user, service flat contract for the use of service and operational data. The file structure complies with ISO 7816 part 4. As no specification was defined at regional level, the design process considered standardized solutions both in terms of specifications and data models, where available. Figure 3 details the Arezzo Card data model.

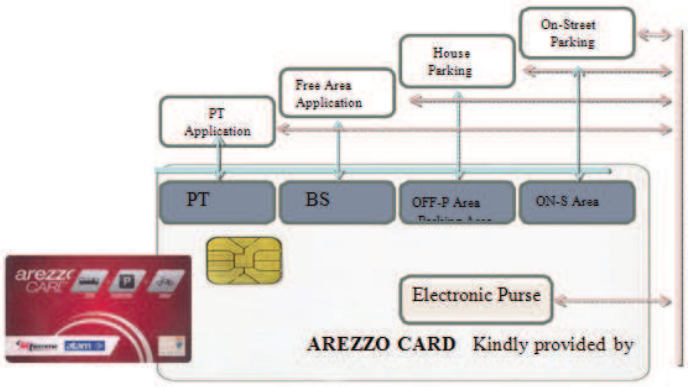

Fig. 3: Arezzo Card data model

7.1.3 Arezzo card system's architecture

The architecture of Arezzo integrated payment system (Figure 4) is based on the following components:

- a common database storing data on smart cards and users shared by all the systems through webservices;
- the various centralized sw modules/DB of each ITS system (PT, PMS, sharing services);
- peripheral devices (validators, park meters, house parking devices - in/out gates and APM, bike sharing stations, car sharing on-board equipment);
- a clearing module to collect data on e-purse credit/debit operations (recharge, payment) and to calculate the incomes of both operators and to guarantee the financial balance of e- purse amount;
- data exchange based on webservices.

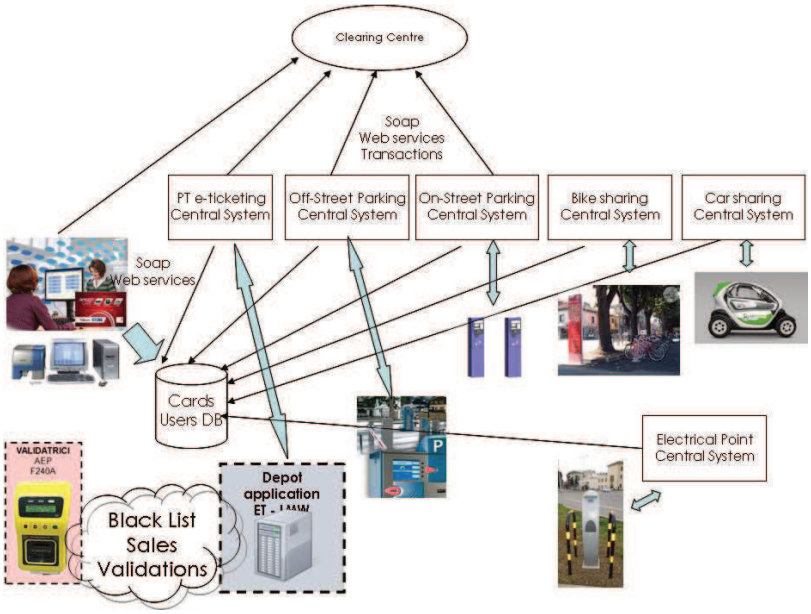

Fig. 4: Architecture of Arezzo Card integrated payment system

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7.1.4 History of the implementation

The design of the integrated payment system for the overall mobility services in Arezzo started in 2012 on the basis of the objectives of both the operators who agreed to have a common and interoperable smart card for promoting P&R schemes and the cooperation with the green mobility services (the existing bike sharing and the planned electric car sharing): Arezzo will be selected then as pilot for this initiative.

The integrated payment system is operated:

- since April 2013 providing interoperability for PT, on-road parking and bike sharing;
- since January 2015 providing interoperability also for house parking;
- since June 2015 providing the interoperability also for car sharing.

Currently about 5000 smart cards are active, about 15000 contracts (PT+parking) are sold per year and about 6000 e-purse transactions are processed per year.

Implementation milestone were:

- design of smart card specifications to enable services interoperability;
- design of sw modifications and adapting for each proprietary systems;
- design and implementation of "interoperable" databases/sw modules;
- definition of the commercial agreement between the operators (tax, revenue accounting and clearing rule);
- integration of different system with "interoperable" databases/sw modules.

7.1.5 Future step of implementation

In mid 2016 Arezzo Card system will be extended to electrical car sharing service.

7.1.6 Commercial agreements between operators

Relevant activities of the design phase related to the definition of commercial agreements between the operators. This activity included: the definition of clearing rule and the requirements for the accountability of the revenue, the management of taxation to be applied to the revenue, the identification of the accessibility level to data (those which are proprietary of the single operators and those must be shared).

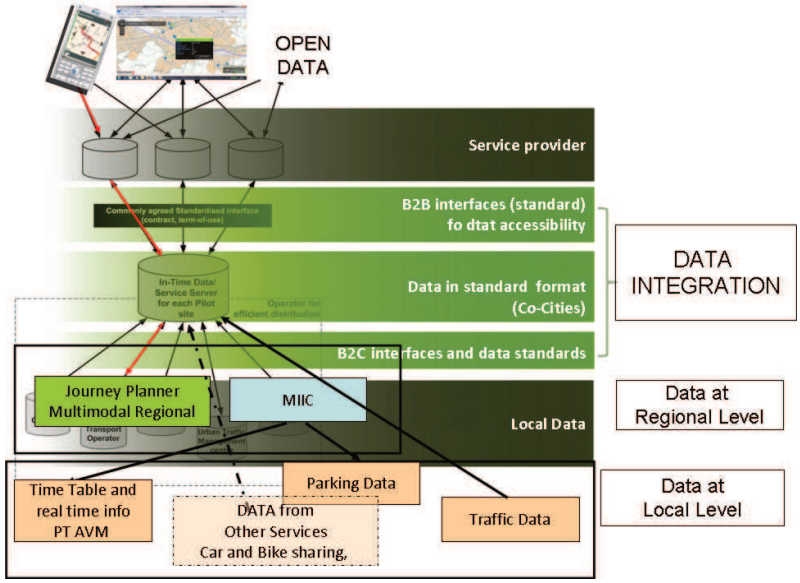

Fig. 5: Logical scheme of the platform for data integration and provision of aggregated multimodal infoservices

8 MULTIMODAL INTEGRATED SYSTEMS

A platform is been developing to aggregate the data accessed from different sources in a centralized middleware, elaborate them and provide aggregated multimodal infoservices on different channels: smartphones, webportal and open data available for third parties. The implementation is articulated in

following steps: a first version of the APP will be published in June 2016 providing a core base of services. In the second half of 2016 APP will be enhanced with other services and the management of feedbacks info from users; in parallel also webportal will be published. At the beginning of 2017 open data will be published. Figure 5 shows the logical scheme of the aggregation platform and adapting interfaces.

8.1.1 Design phase

The main actions carried-out for the design phase has been:

- survey of databases already and detailed info available for the integration and infoservices provision;
- identification of data sources (format) and technical solutions for data access;
- definition of services to be provided by aggregating/elaborating base data;
- identification of the requirements for the platform (adapting interfaces for data access, middleware, APP/web portal/open data);
- definition of platform architecture and functionalities;
- identification of operational use cases to be guaranteed by the platform.

8.1.2 Databases survey and technical solutions for data access

Different ITS systems, database and applications are operated in Arezzo urban area.

The identification of data available and the design of the technical solution for data access and update has been part of the design phase.

8.1.3 Definition of aggregated services to be provided

The following aggregated services are under development:

- Static and Dynamic Public Transport Information;
- Static and Dynamic Parking Information;
- Static and Dynamic Bike Sharing Information;
- Static and Dynamic Traffic Info;
- Multimodal Journey Planning;
- Point of Interest;
- PT tickets payment via web/SMS;
- News and meteo alert;
- Feedback Services for notification of comments on APP usability, info quality and new events.

8.1.4 Architecture for data integration and infoservice provision

The architecture for data integration and infoservices provision (Figure 6) consist of:

- Feeder services accessing to base data/services:
    - request/access of base data and info (this process can be managed on "push" or "pull" modalities) carried out through appropriate adapting services;
- Integration and elaboration process (middleware creation):
    - implementation, management and updating of a common standardized middleware of data from accessed base info;
    - integration and elaboration of the base info to provide aggregated services;
- Displaying process on end-users devices:
    - contents formatting;
    - contents visualization of mobile devices and web portal;
    - publication of middleware data as "Open Data" services.

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The middleware of the platform must gather the base data from their sources and collect them in a centralized structure according to the following requirements:

- adoption of standardized technologies and data format:
  - use of SOA (Service Oriented Architecture) tools;
  - use of W3C web services standard;
- XML for data exchange;
- standardized data model: DATEXII, SIRI;
  - appropriate performances in terms of updating time of data;
  - appropriate security standard level (i.e.: HTTPs protocol).

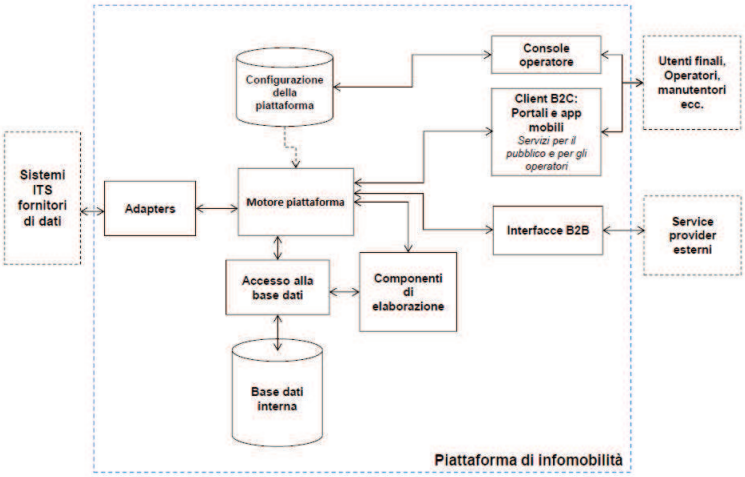

Fig. 6: Architecture for data integration and provision of multimodal integrated services

9 CONCLUSION

The challenge mobility stakeholders must face is to provide a seamless mobility offer able to answer effectively to emerging mobility needs and to impact deeply in traffic congestion, environmental sustainability and liveability in our cities. Far from what it could be argued, the role of Public Transport in this seamless offer should be enhanced rather than being less relevant. Mobility Operators and stakeholders must gain the leadership of ridesharing services which now is mainly managed by commercial operators and plan and operate them as integration of a restructured conventional Public Transport serving main urban axis and corridors. FTS and ridesharing services should be cover feeder/last mile and low demand services (for area, time, target groups). This will be a “win-win” solutions both for larger cities than medium and small ones. Case by case Public Authorities and Operators must evaluate which kind of FTS/ridesharing service is more suitable to integrate the conventional Public Transport offer in order to tailor and to optimize the mobility offer from the planning point of view. From the operation point of view, the integration between conventional Public Transport and other mobility service (FTS/ridesharing) leads to the concept of MaaS where still the Transport Operators/Authorites must take the leadership of the MaaS initiates being the main data/services providers. In this context the role of the Shared Mobility Centre must be considered as “umbrella” platform/organization able to coordinate integrated access to several “on demand and shared” individual and collective services and to manage the various actors and services through an ad-hoc organization framework, technology-enabled services and soft measures. Taking example from Arezzo experience in the implementation of the integrated payment and aggregation of data for the provision of infoservice some critical issues related to MaaS must be highlighted. Firstly in a large part of cities, in particular in the medium and small ones, the integration of data and services will be carried out on the top of the existing legacy systems and technological background which is different from city to city; then an integration model would probably not fit all the cities but it should be customized. Secondly the experience of Arezzo shows that a strong private-public collaboration between mobility actors and Public Authorities is a preassumption to support the provision of MaaS. Furtherrmore commercial agreements will be defined and solutions provided to manage business issues like revenue accountability and clearing rule and solving

potential conflicts between the operators. Lastly MaaS will act on the top of high quality services and data then a strong organizational structure and proper operational procedures are required to guarantee reliable and high-quality base data and an efficient operation of the legacy system to enable MaaS. Otherwise MaaS should represents a new term to identify old problems.

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