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European Union instruments and strategies for sustainable urban mobility: Exploiting PUMS and ITS to develop an efficient car sharing proposal

Claudio Zavaglia^{a,*}

^aPAU Dept. Mediterranea University of Reggio Calabria, Salita Melissari, 89124 Reggio Calabria, Italy

Abstract

In the last decade, a big European effort has been made in terms of research, strategies and initiatives to boost new forms of sustainable urban mobility to replace individual transport. Among the other instruments identified to achieve this goal the European Commission emphasises integrated planning at all mobility levels, to be realised through the writing of the PUMS, and its management and through Intelligent Transport Systems (ITS). Under these two conditions, car sharing is expected to become an efficient sustainable transport service, able to limit the use of private cars and to facilitate multi-modality for public transport.

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1. Introduction

For the past several decades, transport and mobility have been a crucial part of our economy and our society whilst conducting a vital role both for the internal market and for the quality of life of citizens. However, European

* Corresponding author. Tel:+39-3337788448
E-mail address: claudiom.zavaglia@gmail.com

cities which are home to 70% of the EU population and generate more than 80% of EU GDP, even though they are connected by one of the best transportation systems in the world (the TEN-T network) have within them an increasingly difficult and inefficient mobility. Urban mobility is still based very largely on the use of public and private means to conventional power, while the moving towards more sustainable transport methods occurs very slowly. In fact, many European cities suffer from traffic congestion, with annual costs estimated at 80 billion euro.

European urban areas, as well as being responsible for a very large part (about 23%) of all CO₂ emissions from the transport sector, also have a high number of fatal accidents. An estimated 28,000 in 2012 around 40% takes place in the urban centres. (Mastretta M., & Burlando C, 2007)

Eurobarometer survey analysed the position of citizens in the sector of urban mobility. The vast majority of those considered of primary importance where the problems of congestion the costs and impacts on human health, mobility and urban transport. (Speciale Eurobarometro 406, 2013)

In the light of these considerations, the European Union, in the "Europe 2020 document "A strategy for smart, sustainable and inclusive growth", stresses the importance of creating the most modern and sustainable transport system for the future development of the Union, through spatial planning, which is the result of feedback from a synergy between the different sectors and areas of urban areas [4], and by the inclusion in the organisation of the modern intelligent management systems and mobility services that are able to improve efficiency.

2. The proposal of the European: PUMS of Sustainable Urban Mobility Plans

The European Commission points out that, in order to transform urban mobility effectively, it is necessary to operate the assessments that are the result of a joint action between the different transport sectors, policy makers and relevant authorities at all levels. In order to make significant improvements and decisions it therefore appears essential to end the fragmented approaches of the past. From this premise, which was created from the European Commission's proposal to develop the PUMS - sustainable mobility plans, taking into account the urban area and proposing initiatives to be integrated in a wider urban and regional strategy. These plans should be developed in cooperation between different sectors and policy areas (transport, planning and land use, environment, economic development, social policy, road safety etc.), between the different governmental and administrative levels and in cooperation with the authorities of neighboring areas, both urban and rural, keeping in mind that an adequate and proper urban planning can already contribute to the base to reduce the need for mobility, such as to avoid urban sprawl.

The PUMS then aimed to achieve a balanced development and better integration of different modes of mobility. These ideas about planning show that urban mobility concerns primarily the people and therefore places emphasis on the participation of citizens and stakeholders while promoting a change of mobility behavior. In the various approaches to urban mobility and related plans it should also be taken into account urban logistics. The operations and urban logistics have a significant potential for improvement and captive fleets, (such as those of mail delivery or garbage collection), and lend themselves to being rapidly replaced by new types of vehicles and alternative fuels capable of reducing dependence on oil, contributing to the intended objective with zero CO₂ emissions of urban logistics in major European cities by 2030.

The idea of sustainable urban mobility plans has raised considerable interest in recent years, which is why the European Commission intends to continue to support the promotion and development in the coming years. However, to ensure widespread adoption of best planning practices, such concepts should be aligned to the specific requirements and existing planning practices in each Member State and should be actively promoted at a national level. In addition, the member states should be taking adequate measures to establish framework conditions that allow local authorities to implement successful strategies.

[... Member states should therefore:

- Make a careful evaluation of the efficiency of this urban mobility in their respective territories, especially in light of the EU's key strategic objectives:
- Develop an approach to urban mobility which ensures coordinated and integrated interventions at national, regional and local levels;

- Ensure the development and implementation of sustainable urban mobility plans in their territories and the integration of such plans in a wider strategy of urban and regional development;
- To review and modify if necessary, the technical, strategic, legal, financial and other issues available to the planning authority;
- Adopt measures to avoid fragmented approaches to ensure the continuity and compatibility of urban mobility measures for the protection of the internal market;
- Ensure that urban logistics are taken into account as one of the key parts in the time of preparation of PUM.
- Create platforms for cooperation, exchange of data and information for all subjects of urban logistics chain.]

As mentioned previously, therefore to be applied widely and effectively, ideas and tools that have been developed at European level must be adapted to the particular circumstances of each Member State. It follows that the added value of an EU-wide support is to ensure a broad debate on urban mobility in the EU, facilitating the exchange of experiences and Best practices, and in catalyzing research and innovation which also provides financial support to urban transport projects. (Calabrò & Della Spina, 2014)

[... The European Commission for its part intends to...

- Establish and constantly update a European platform of sustainable urban mobility plans for coordination of EU cooperation to the further development of this concept and the means to achieve it;
- Provide a one stop shop and expand the existing website www.mobilityplans.eu to make it a virtual center of knowledge and skills;
- To support the national, regional and local authorities in the development and implementation of sustainable urban mobility plans, including financing instruments;
- Improving the dissemination and adoption of best practices in the field of urban logistics;
- Develop, with the help of experts, guidance documents to provide practical assistance on how to improve the efficiency of urban logistics, drawing up contingency plans and service delivery;
- Facilitate the procurement of clean vehicles used in logistics reviewing the scope of the "Clean Vehicle"] of the portal application (White Paper, 2011).

3. Coordinated application of intelligent transport systems in urban areas (ITS)

While the European Commission considers it essential that urban planning is the result of a joint effort on several fronts, on the other hand it considers it equally important to make technologically modern mobility system, in order to maximize efficiency. If until now we have therefore discussed the importance of developing mobility plans based on the close cooperation of the most strategic areas, with regard to technological modernization, the European Commission recognizes the ITS - Intelligent Transport Systems, as a tool that to date, more than any other, allows us to manage a "smart" mobility. The European Commission has in fact long been highlighting both in the 2001 White Paper "European transport policy for 2010: time to decide", both in the White Paper of 2011 "Roadmap to a Single European Transport Area - Towards a political of competitive and sustainable transport ", the role of ITS as a tool for achieving the goal of a fully integrated transport network (Programma HORIZON 2020, 2014) (Commissione Europea, 2013)

Through advanced navigation systems and satellite positioning (GNSS) based on European platforms "Galileo" and "EGNOS" would be possible:

- Real-time multi-modal information;
- Road safety information
- Immediate relief roads through the snapshot location (via the eCall and the SoL service - Safety of Life Service);
- Reservation of parking lots;
- Charging and intelligent ticketing via smartcards;
- Vehicle-to-vehicle and vehicle-to-infrastructure
- Monitoring of public transport;

- Monitoring of the transport of dangerous goods;
- Location of missing or stolen property.

The exercise of the systems implemented so far around the world, both at urban and suburban level, allowed to tangibly assess the benefits brought by the ITS. Experiences in different countries, both in the US and in Europe, report that in different applications the following results were obtained:

- Reduction of travel time of around 20%
- Enhance the capacity of the network by 5-10%
- Decrease in the number of accidents by 10-15%
- Decrease congestion by 15-20%
- Reductions in pollutant emissions by 10-15%
- Reduction of energy consumption by 12%

Of no mean importance is the fact that these benefits have been obtained for modest investments, and by far lower than those required for the construction of new infrastructure (Calabrò & Della Spina, 2014). In a phase of growth during the apparent contraction, the ITS solutions therefore allows us to deal effectively with and cost many problems associated with urban mobility.

In order to promote the wider dissemination and development of interoperable and harmonized ITS, in December 2008 the European Commission published its Action Plan for the Deployment of Intelligent Transport Systems (ITS Action Plan) and Directive 2010/40 / EU in the July 7, 2010 with the goal of creating regulatory conditions, organizational, technological and financial measures to facilitate the transition from a very limited and fragmented reality into a coordinated large-scale deployment of ITS across the European territory, able to fully produce the benefits that they can make to improving the safety and quality of life of European citizens, also in economic and employment terms, with considerable advantages in terms of cost reduction and therefore the transport efficiency inside and outside.

4. Best Practices: Car Sharing

In conclusion, we have just seen how, to improve the quality of mobility in urban centers, the European Commission's emphasis on two points: integrated planning that exceeds the fragmented approaches of the past, hence the proposal of PUM , and the introduction of ITS as a tool to be exploited for the management of such processes of mobility. From an analysis of these two factors comes an interesting proposal of sustainable mobility, that of Car Sharing.

Although the first car sharing companies were initiated around the 90s, the deployment of the service took place thanks to the exploitation of just 2 analysed points. The integration and the joint organization of urban systems of transportation, took place thanks to PUM and allowed car sharing to be included within the framework of mobility as a system for the supply of public transport in order to encourage and facilitate intermodal exchanges.

The advent and use of ITS, in particular of on-board satellite technology, have also greatly facilitated the deployment of the service by creating reservation systems, collection and interpretation of information in real time which is extremely fast and can be carried by any device.

Entering the specific service, with the English car sharing term defines "the use in sequence of a single vehicle is used by a plurality of users, mainly through public initiatives tending to constitute a car park accessible by the user and available at fixed points, after paying a fee ". It is a measure that is part of strategic leadership of the private car dependence reduction, and aims to contribute to the correct sizing of the vehicle compared to the demand for mobility and, more generally, in reference to the size of the offer of the question.

The service is usually provided by an operator that offers the sharing of a car park to its subscribers, each of whom pays only the actual use of vehicles. Single car during the day is therefore guided by more people, individually and at different periods, for the time necessary to each to meet their needs for mobility.

In detail, the service is divided into 5 points:

- Subscription: to gain access to the service is required to sign a subscription through the signing of a contract and the payment of a fee;
- Reservation: free reservation of the vehicle through the Call Center, operating 24 hours at 24 to 365 days, or On Line (you can book up to 15 minutes before use);
- Withdrawal: for collect the car just place the card (provided at the time of subscription) to the sensor on the glass and the machine is opened;
- Guide: Using the vehicle. It points out the possibility to use the lanes intended for buses and taxis, free parking in blue areas and islands in the azure of the Municipality, potential uses in town centers, restricted traffic zones and in the days to “number plate”;
- Drop: After use, the car goes where she was taken, putting the keys in the glove compartment. Supporting the Smart Card back to the windshield doors will close and the use will be concluded.

The advantages that are derived are:

- Abolition of fixed costs: purchase, insurance and car stamp of ownership;
- Abolition of maintenance costs and related inconveniences (loss of time, replacement car necessity);
- To have a more clean vehicle and efficiency;
- Ability to select the right vehicle for your needs and modes of transportation (a city car to move into town, a family shopping);
- Abolition of the need for a parking space or a garage;
- Free access to restricted traffic zones and on days of traffic blocking (ecological Sundays, number plate);
- Free use of bus lanes for buses and taxis;
- Free parking available on municipal and blue stripes on yellow stripes for residents;
- Abolition of refueling costs;
- Support of guaranteed road (free emergency call e-Call);
- Programming possibilities of the most convenient routes thanks to traffic information in real time (thanks to the presence of satellite navigation systems found in cars).

The competitive potential of the service lies in the originality of the offer: you buy the use of the medium rather than the medium itself, are then guaranteed benefits similar to those of private cars in terms of flexibility and comfort, but private and external (costs) lower than the property that involves a high level of fixed costs to be incurred regardless of the actual use that is made of the car in terms of mileage and time of use.

Car sharing is a service that, in our cities, could be an effective and useful idea for current mobility. The service reduces the environmental impact of the circulation, reduces costs and at the same time allows an increase in the number of stands and the user's choice opportunities.

Baste think that in Europe, 80% of cars circulating in the city travel no more than sixty minutes a day carrying an average of 1.2 people. The automotive market, in fact, offers many choices for those who want to buy a vehicle, but gives few alternatives, economic and functional, to those who use it only occasionally. Car Sharing addresses the latter category of motorists: the opportunities of choice guaranteed by the variety of car parks and the possibility to move without incurring the problems and fixed costs of car ownership, represent a viable alternative to purchasing.

Furthermore, Car Sharing produces, in time, beneficial effects on the environment. It loosens the grip of vehicle traffic in urban centers and promotes more rational individual behavior using their car for the benefit of environmentally friendly and energy intensive transport. The development and expansion of car sharing on a larger scale cannot ignore the existence of a good collective transport system across the national territory, since it is a complementary service and not a replacement.

5. Car Sharing in Italy: the example of Venice

The Italian landscape offers several interesting examples of car sharing, which are characterized by having, over the years, steady growth in terms of users and proportional enlargement of the fleet, and therefore more generally constant expansion at the corporate level. An example in question which undoubtedly stands out is car

sharing in Venice.

In terms of territorial structure Venice presents such a variation of types of relationships on which they insist varied categories of questions, as to suggest that such a service is Car Sharing can find good compliance. And in fact a category, which is particularly interested in the service, is made up of residents in Old Town (about 70 thousand inhabitants, including the Giudecca and Murano), who do not own their own car or, if they do possess, have considerable difficulties in managing and use of the medium. It is in this unique feature of the Venice territory that car sharing gains considerable opportunities in terms of access to the service.

With the exception of the municipal parking lot in Piazzale Roma in fact, the other parking lots are located on land, particularly in car parks in Marghera adjacent to Liberty Avenue reached by bus from Piazzale Roma. This is an awkward situation, with about 30'-40' to reach the car from home, which determines an inevitable under-utilization of the car.

For these residents the offer of car sharing for occasional car trips on the mainland (business, personal practices and purchases) should be an economic and efficient solution.

The car sharing service in the Municipality of Venice is run by A.S.M, who on behalf of the City, also deals with the management of parking.

Active from August 2002, in the first three years of activity has come to have a fleet of 21 cars spread over 5 parking lots, with 1,084 members, of which 85% individuals and 15% of collective entities.

Today the service (last update February 2015) counts: 43 Cars, 3,574 users and 13 parking spaces.

6. Conclusions

In the light of these considerations, car sharing can really bring an interesting contribution to improving mobility in urban centers. It can in fact, in addition to being a valid alternative to short trips still dominated by private transport, be a valid means of supply and support the public system. In order for this service proves this, and you can enjoy the benefits that can potentially lead as we have seen in the examples above, it is necessary that this service is added to a mobility that works synergistically. The role of PUMS at this point becomes crucial because of coordination instrument of a mobility which will have to be considered not as a sum of sectorial systems of transposed to arrange separately, but in a comprehensive manner. As advocated by the European Union, the best help for this can be considered a formidable challenge, are the ITS, technological systems with which it is possible to have a constant overview of mobility, real-time, analyzing the flows, schedules, critical nodes, and providing the user with an overview of both the possible problems that the real coincidences of different means of transport. Included in this context, car sharing can really offer a valuable service by facilitating the movements in congested urban centers and encourage modal exchanges between different transport systems.

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