Urban Access Management and Smart Mobility today

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Objectives in Urban Access Management
Preserving and improving quality of life as well as developing the economic competitiveness, social, cultural and touristic development are the primary objectives of municipalities, be they large or small. To achieve these goals it is necessary to impose, at least partially, rules and restrictions for the access and parking of vehicles and the transportation of goods in urban areas. The absence of respective rules actually affects the central urban areas, as they become inaccessible and less attractive for carrying out the activities of daily life such as work, studying, entertainment and more. Often the causes of traffic congestion are due to the lack of parking areas that cope with real user demand, the limited use of public transport, undersized public transport and last but not least, the bad habits of some users (chaotic parking).

In addition, other aspects that influence the quality of life gain importance such as the reduction of pollutants (particle matter PM10 or PM2.5, NOX, ozone, etc.), noise or carbon emissions (CO2). Finally, road safety is an issue.

These are typically the conditions that lead municipalities to manage access in urban areas.

In the last decade different studies and Urban Access Management projects (as Congestion charge, Low emission Zone, Limited Access zone) have been done and deployed in urban areas. These have demonstrated that urban management can serve a range of objectives, including congestion relief, environmental enhancement and revenue generation, each of which may be best served by a different type of urban access scheme. Efficiency, the environment and revenue generation have traditionally been considered to be the fundamental objectives.

In urban areas, infrastructure capacity cannot keep pace with demand. We have to make sure that demand match capacity and that is what Urban Access Management does. And it works! There is no doubt, that the access management scheme influences the mobility behaviour of individuals and businesses; access management becomes an instrument with which to shape mobility behaviour. It is obvious that such measures may lead to conflicting interests.

Consequentially, traffic policy measures have to be assessed with regard to their strengths and weaknesses by analysing the urban context, the viability of introducing such systems, the technical aspects of electronically enforced access management, and the promotion of public transport, pedestrians, cycling and also the way businesses will cope with the measures.

The possibility to define different tariffs for different users makes the Urban Zone Access
Management a flexible system to reduce traffic congestion in a very selective way. Specific users may be identified as exempt or entitled to a discount from the charging scheme for specific reason such as disabled, residents, buses, taxis or others. Also the ban access time could change during the day for the same user.

Depending upon the requirements of the city and the transport policy, an Urban Area Access Management may utilize a combination of any of the above access schemes and should support the full range of charging policies, whether based on time, passage, emissions or traffic dependent and can also be integrated with a distance-based system. Further, the equipment and systems should be flexible in order to handle a variety of schemes in combination and encompassing a wide geographical area.

The more we increase the parameters that influence the system, the more complicated or sophisticated system will be. In this case a transparent communication campaign for the citizen, a good enforcement system and a good IT solution to easily manage the whole system is a must.

**Urban access management and Mobility**

According to the United Nation's predictions in “World Urbanization Prospects, The 2009 Revision,” the urban population will reach approximately 4.9 billion in the year 2030, which means that approximately 59% of the world's population will live in cities.

In other words, the actual congestion, pollution and mobility issues will be in the future even worse and we have to deal with them in advance. This is our challenge now! And this will be more critical in emerging economies. If the urban mobility issues are neglected, they can have a number of negative effects on the city as a whole, and again an exacerbation of the global warming problem due to the greenhouse gases in emissions, a greater impact on economic activities due to traffic congestion, and an increased number of traffic accidents leading to a reduced level of lifestyle satisfaction.

In developed economies, on the other hand, car-centric societies are beginning to be reformed from the perspective of environmental issues, and there is an increasing interest in eco-mobility and modal shifts. Furthermore, the future maintenance of deteriorating infrastructures is starting to become a major issue.

In the contemporary car-centric societies, many people have given higher priority to their own comfort in how they move in the cities by car respect the social interest. This has caused road congestion, and has had a negative impact leading to pollution issues as well. But what would happen if, in order to solve this problem, vehicle access restrictions or urban access management policy were placed on cities? Someone would think that as an excessive restriction on free movement, then transportation users would probably find life in such a city uncomfortable, and the city would lose the potential for future growth.

Is that happening in Cities which applied for a congestion charge as London, Stockholm or
Milano? Or hundreds of Cities in Italy which apply the so called ZTL (Zona a Traffic Limitato), a Limited Access Zone?
Not at all. In Stockholm the project is a big success today. Milano is even thinking to extend also the zone.

<table>
<thead>
<tr>
<th>City</th>
<th>Results</th>
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<tbody>
<tr>
<td><strong>London</strong></td>
<td>Day Pass Ticket</td>
</tr>
<tr>
<td></td>
<td>Traffic: -14% … -16%</td>
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<tr>
<td><strong>Bologna</strong></td>
<td>Limited Access Zone with charged special permits</td>
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<tr>
<td></td>
<td>Traffic: -23% (work day); -31%(weekend)</td>
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<tr>
<td></td>
<td>PM10:: - 47%</td>
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<tr>
<td><strong>Stockholm</strong></td>
<td>Passage Sensitive</td>
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<tr>
<td></td>
<td>Traffic: -16%</td>
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<tr>
<td></td>
<td>CO2: -2,7%</td>
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<td>Noise: -1 … -2 dBA</td>
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Also other examples could be found worldwide and their impact in urban mobility is evident: increasing bus ridership, increasing travel speed as also reducing traffic delay, pollution and car accidents.
Consequently a lot of vehicle drivers changed their behaviour, using more public transport instead of private cars. But this only happens if a good urban mobility scheme has been guaranteed, that a proper communication plan is established, and it is accepted by the citizens. Also pedestrians benefit from the scheme. More importantly, the acceptance of this policy as a whole is maximized.
This should be the real goal of an Urban Access Management system: to change the behaviour of the citizen in the city. First of all, of those who drive vehicles. The Urban Access Management is encouraging this change.
An innovative methodology in urban access management

An innovative approach is to use incentives for drivers to change their behaviour. This is an effective alternative to the typical disincentives used in urban area such as congestion charges which most people dislike.

For example if a commuter parks his car in a specific parking facility (for example a Park&Ride area) and takes a bus to access the city centre, he will get a virtual bonus point that could be converted into a public transport ticket discount, or coupon to spend in a city centre shop or somewhere else. The bonus point may be an additional trigger for the choice of the car driver who is not motivated only by environmental factors (social aspects) but also by personal interest (individual aspects).

Other example could be the same Park&Ride and car sharing with colleagues or e-bike as alternative in a sunny day. The methodology could be used also for no-driver user too. If you use public transport system or other eco mobility systems, you get bonus points.

A smartphone application then could track mobility decision, buy tickets and manage account bonus points in an easy way.

Experiments and Returns of Experience

Such an approach with the corresponding access scheme was used and demonstrated on the campus of University of Salerno in the European Project COSMO (University of Salerno, Swarco Mizar SpA, Kapsch TrafficCom AG), in southern Italy; it is 12 km far from the city centre and is spread over an area of 1 square kilometer. Every day over 2,000 university teaching and administrative staff and 18,000 students reach the Campus, determining a traffic situation comparable to that of an urban area.

The system was developed by Kapsch as a dynamic tool where the vehicles inside the area are tracked and even before when the car is approaching the area a message will be sent and displayed on an On Board Unit (OBU) inside the vehicle.

The information contains a park suggestion depending from the filling rate of the two main parking facilities. Additionally to enhance the reason of a parking choice a bonus point scheme was used. If the car driver accepts the suggestion and parks the car in the area suggested, he gains some bonus points that could be converted into coupons to spend in the university cafeteria.
Participants in the pilot project have showed a high interest and acceptance on such an approach that is also connected with the rewards used. In general if we are able to gauge the driving distance (savings), while also taking into consideration the vehicle’s characteristics, the road type and traffic conditions, we are also able to estimate the saving of fuel, and consequently the reduction in CO₂ emission. Last but not least, are the factors of time saving and the increasing of safety due to a substantial optimization of traffic congestion.

**Conclusions.**

To have an Urban Access Management system alone will not solve all traffic or environmental problems. Politics, public transport or better still, all urban mobility and city contexts (size, inhabitants, public infrastructures, public opinion and local culture) play a large part in the system and how it will be successfully implemented. It is like an orchestra where all instruments need to play in “harmony” together, with the right tempo, tone and volume. If the first performance is not yet perfect, the system should be tuned again. As we live in a dynamic world also the pre-condition of such systems could change over time and again new tuning of the system is required.
References.

- Scott Willson, A. (2011). The opposite of congestion pricing – and it works United Kingdom: Rational Transport

Biography.

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He is Italian, he studied economics at the university of Pisa and since 1995 is living and working in Austria. He worked as Project Manager for 7 years in international IT projects (Geographical Information System, Decision Support System and Enterprise Content Management) and as Business Development Manager for more than 10 years. From 3 years has joined Kapsch TrafficCom AG as Solution Manager in Electronic Tolling Collection for City Solution studying Urban Access Management and its impacts in cities life. Actually, he is engaged in several projects in Europe and outside.