

Development of mobility services in Europe

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Main Challenges in Urban Mobility

❑ Emissions

- Greenhouse Gases → Climate Change
- Pollutants → Public Health

❑ Congestion

- Avoiding so much wasted time
- Control dominance of cityscape by cars

❑ Safety

- Reduce risk levels and exposure, mainly for vulnerable segments

❑ Energy Efficiency and Security

- Securing supply at affordable prices

Technology Delivers...

❑ Cleaner Vehicles

- Alternative fuels
 - Which alternative energy sources?
 - New (more complex) distribution system
- Better Energy Efficiency

❑ Smart uses of information available everywhere

- Better distribution of traffic on network
- “Contouring” accidents
- More efficient use of Public Transport
- Real-time Risk preemption in driving

But is it enough, and soon enough ?

❑ Probably not, at least in some accounts

- Electricity and Hydrogen are good energy carriers, not sources
 - Emissions strongly dependent on how they are generated and transported
- Long time between market entry and strong market presence (some 10 years)

❑ Most optimistic forecasts indicate a reduction of GHG emissions in rich countries to 50% of 1990 levels by 2050

- But a reduction to 25% would be needed to honor international goals

From efficient vehicles to efficient mobility

- ❑ Even with totally clean vehicles, major congestion levels and associated problems remain
- ❑ We must act not only on vehicles and on their paths, but also on Load Factors (pax / vehicle), Modal Choices and on Mobility Patterns of people and freight
 - More difficult, as this requires behavioral adaptations
 - Similar type of problems exist for freight (not covered in this presentation)

High Space Productivity to reduce congestion

- ❑ To reduce congestion we must increase the productivity of urban space
- ❑ Transport Output is Pax.Kms ; Space Input is m².minutes (really it is space.time)
- ❑ Productivity can be calculated dividing the output by the input

$$\rho = \frac{Pax.km}{m^2.min} = \frac{Pax}{m^2} * \frac{km}{min}$$

- ❑ Productivity can be obtained by the product of density (of passengers by square meters of land) and speed (of the vehicle in which they are moving)
- ❑ This density can still be obtained multiplying the density of vehicles per square meters of land by the average load factor of those vehicles
- ❑ Best results are obtained for collective modes in dedicated sites and high occupation (suburban rail, metro, BRT), and also for walking and bicycle

Flexibility and little time spent for the citizen

- ❑ Citizens want to spend little time (and money) in transport, and to travel when they are ready for it, not when some service supplier is ready
 - Flexibility of travel times
 - Direct connection from anywhere to anywhere
 - Comfortable and with reasonable price
- ❑ Individual modes provide the best result in this aspect
 - Walk, bicycle, private car
 - Range limitation for the two former, mopeds very good compromise
- ❑ For collective modes, results can still be good when they provide
 - Good commercial speed (few stops, priority at intersections)
 - High frequency, with no or very few transfers
- ❑ Combination of individual + collective (Park & Ride) can be good solution, but requires big space for parking (cars or bicycles)

What else is needed beyond Technology

❑ Innovative services

- using existing or emerging technology

❑ Regulation in support of innovation

- Instead of blocking its deployment

❑ Rational Prices

- Reflecting value, scarceness and external impacts on prices

❑ Consistent Policies

- Across several domains: transport, land-use, fiscal, RD&I

Coordinated action in all these directions is needed to provide significant relief to congestion and air contamination !!

The Political Scene – EU level

- ❑ European Commission launched the CIVITAS program in 2002
 - Co-financing of innovative urban mobility projects
- ❑ And published a Green Paper on Urban Mobility in Sept. 2007
 - Essentially signaling the need for a new Culture of Urban Mobility
 - Will be followed by an Action Plan
- ❑ European Parliament approved a Report on April 2009 criticizing the Commission for not having published yet the Action Plan, and specifying a number of principles it want to see respected:
 - Specific projects to be carried out by city administrations
 - Need to create an observatory at EU level and compile better statistics
 - Need to further R&D in Intelligent Transport Systems, and to dedicate higher share of Transport R&D to urban mobility
 - Etc...

Development of New Mobility Services in Europe

- ❑ Stimulated by the CIVITAS program of the European Commission
 - 36 (mostly midsize) cities, around 300 different projects
 - Cleaner vehicles in Public Transport
 - Access control in central urban areas
 - One-way bicycle rental
 - Car-sharing and car-pooling
 - Integrated information and ticketing systems
- ❑ Many other cities acting independently, mostly in the same areas
 - Projects with most visible (and positive) impacts
 - Many light-rail projects in the last 20 years, some BRT recently
 - Access control in central urban areas
 - One-way bicycle rental
- ❑ However, car traffic volumes are not being reduced (except in controlled access areas)!

Early Steps, apparently easy

❑ Immediately available improvement: *Modal Alternation*

- Adjust mobility solutions to the agenda of each day
 - Some days are simpler (home – work – home), other more complicated (shopping, social encounters, children's activities, etc.)
- But for many people, at least two or three days per week are “simple” and would allow good service by collective transport
 - Very significant gains if this behavior was adopted

❑ Big barriers exist to this scheme (but could be removed)

- Information / Transaction Costs (on availability and on usage rules)
- Tariffs (favorable deals based on daily usage)

Bridging the Gap

- ❑ Searching for the ***double second-best: develop solutions that are***
 - Almost as consumer-efficient as individual transport (flexibility)
 - Almost as social-efficient as public transport (space productivity)

- ❑ An important role for ***intermediate alternative modes and services***
 - Enriching the choice set, to be used in a “modal alternation” setting
 - A closer fit to everybody’s mobility requirements
 - Contributing to a much more efficient overall result

Some new Intermediate Services (currently in our research)

□ *Four Examples:*

- *One based on Public Transport modes:*
 - *Real Time Dispatch in Collective Transport*
- *One based on Private Cars*
 - *Carpool and Carpool Club*
- *One based on Taxis*
 - *Shared Taxis*
- *One based on privately chartered Buses*
 - *Express Chartered Minibus*

Some Intermediate Services – Basic Concepts (I)

- ❑ **Shared Taxis** – Phone-based, real time offer of a taxi with pax(s) on board to a new pax with overlapping path
 - Based on info about boarding location and destination of requesting pax
 - Very low time penalty for all passengers, big savings, added revenue for operator
- ❑ **Express Chartered Minibus** – Regular minibus service for suburb to center (or suburb to railway station)
 - Very few stops at either end, travel time similar to car
 - Fixed set of clients, at least equal to break-even load
 - Slack capacity available for occasional guests

Some Intermediate Services – Basic Concepts (II)

- ❑ ***Real Time Dispatch in Collective Transport*** – Phone-based “Electronic Travel Agent” organizes passengers’ journeys in real time
 - Making use of full information on current locations and load factors of vehicles, and expected arrival times at every stop / station
 - Synchronization guaranteed: On acceptance by client, information to drivers of downstream vehicles about the progress of the upstream (delivering) vehicles
 - Strong quality boost for journeys involving transfers: decisions based on current situation and short-term projection, not on averages
 - Easily accessible by mobile phone, progress along route can be tracked for feed-back to operator and to client

Some Intermediate Services – Basic Concepts (III)

- ❑ ***Carpool and Carpool Club*** – The usual carpool scheme is widened through a club of carpools along the same corridor, for mutual support
 - Carpools frequently fail after some months, mainly because of different activities of members after work, affecting their requirements for the return trip
 - Not everyday, but frequent enough to cause disruption
 - With enough carpools in the same corridor, good probability that the person returning later than her group will have a place available in a vehicle of another group in the club
 - Easy quasi-real time reallocation if basic carpools have one empty seat (like most do today)

Why are these offers not out there ?

- ❑ Technology is not the reason
 - All of these new services use technology that is currently available (or just around the corner)
- ❑ Regulation
 - Some of them would not be allowed today
 - Generalized subsidization in European Urban Public Transport constrains innovation
 - Public Authorities always believe they know best what the citizens wish
- ❑ Economic Viability
 - Maybe because launching risk is too high or because they are not economically viable (each service by itself)

From Concept to Business Model

- ❑ What was just presented are concepts, some “rough edges” must still be polished
- ❑ Basically two (interactive) steps, both part of the Business Model
 - Value Proposition for the Client
 - What (implicit) attributes are perceived as repulsive, what attributes could be added to enhance attractiveness?
 - What features are needed to enhance trust in the new service (or at least willingness to try)?
 - Possibly, different perceptions & reactions by different market segments
 - Provision Costs and Prices
 - How much does it cost to provide the service with the desired features?
 - How much are the clients willing to pay?

Focus-Group Assessment of the New Services – Generic Descriptions (I)

❑ Shared Taxis – *Warm Welcome*

- **Pros** - price, environmental friendliness, especially useful when PT has low frequency and when private car is unfit (eg evening sorties)
- **Cons** – possibly longer travel time and lower reliability, price reduction maybe not enough, personal security issues (mainly from women)

❑ Express Minibus – *Warm Welcome*

- **Pros** – comfort, could solve problems associated with multimodal monthly cards
- **Cons** – lacking flexibility for users with more complex mobility patterns, generally concerns over service times and overall schedule

Focus-Group Assessment of the New Services – Generic Descriptions (II)

- ❑ **Real time dispatch in collective transport** – some skepticism on feasibility
 - **Pros** – convenient, in any case much better information for passengers
 - **Cons** – Can it be implemented?

- ❑ **Car-pool** – for many people, only as last resort
 - **Pros** – costs, environmentally friendly
 - **Cons** – loss of independence and autonomy, possible conflicts with other poolers

Value, Cost and Price

- ❑ Each suggestion of improvement of the Value Proposition must be evaluated in terms of
 - How much it costs to provide the service, with very efficient production schemes
 - How much additional demand of the original service it is expected to bring
 - By how much it changes the willingness to pay
 - By how much it expands the market, ie what collateral services can be delivered (at low marginal costs)
- ❑ All of these services must be economically self-supporting
 - But public support in a kick-off phase could be justified to reduce the barriers to their creation (as it is done for freight intermodal services in the EU – Marco Polo program)

Mutual Support of the new services

- ❑ Some limitations of the new services may be solved by recourse to another of these services:
 - Missed your car-pool return trip ? Use another pool in the club or an Express Minibus to your neighborhood
 - Missed your scheduled return trip on the Minibus Express ? Use a car-pool to your neighborhood
 - The best Public Transport connection now gets you there too late ? Bring shared taxi into the solution for part of the journey (where the waiting time on the connection is too high)
 - And so on...

The Regulatory framework (and attitude)

- ❑ Provision of Urban Transport services is strictly regulated, creating an additional barrier to the emergence of offers like those shown here
 - Shared Taxis are illegal in most developed countries
 - A mixed-type bus service, basically chartered but giving access to additional passengers, is illegal
 - In most EU countries, carpools enjoy no privilege in circulation (HOV lanes) or in parking (exclusive places)
- ❑ Regulatory Agencies must change their attitude, from full preservation of status quo towards a mix of stability and innovation at the borders
 - mimic the creative destruction permanently occurring in social life

Integrating Urban Mobility Services

- ❑ In Road Networks, international, national, regional and local roads are interconnected seamlessly
 - And represented in the same maps !

- ❑ In Urban Mobility, interconnection across modes and services is far from achieved
 - Even in “integrated” systems, try obtaining information on frequency of service or running hours of a bus line from a subway operator
 - This acts as a strong deterrent against experimenting different transport solutions
 - Opposite to what happens with driving, where we all occasionally experiment new routes

Integration, loyalty, value for clients

- ❑ In a Modal Alternation framework integration becomes even more critical
 - Citizen must obtain (and trust) information on all offers, and be able to combine them in real time
 - Especially when the “usual” service could not be used (for whatever reasons)
- ❑ “Upgrades” as loyalty rewards
 - After a certain level of consumption of mobility services, “upgrades” to more sophisticated services offered
 - Value for clients, but also promotion of the concepts of integration and alternation

The need for a Mobility Integrator

- ❑ The role of public agencies in charge of mobility planning and organization has to be expanded
 - Covering all aspects and modes in urban mobility in the same agency
 - To ensure integration
 - To promote innovation and facilitate its deployment
 - To get early recognition of supply gaps in relation to emerging mobility requirements
- ❑ Synergy + Permanent adaptation + leadership towards sustainability
- ❑ Also, an integrated vision and management helps solve financing problems in urban mobility

Thank You for your attention !



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