Recommendations and guidelines report with identification of future needs

Joint recommendations on policy for future cooperation with Latin America, China and Singapore

June 2014

1. Introduction

The forecasted increases in population and the levels of urbanisation within Latin American countries and China present significant challenges sustainable urban transport solutions. For example, the urban population in Latin America in the last four decades has grown from 56.4% to 79.5% of the total population, and is expected to reach 84.3% by 2035 [1]. Problematically, in most cities of Latin American, the infrastructure, vehicles and planning concepts relating to private and public transport may be of a lower quality than their European counterparts. In addition, there is often a lack of awareness and/or knowledge regarding sustainable transport solutions. Recognising this situation, in 2012 the world's biggest multilateral development banks (MDBs) pledged $175 billion over 10 years to help fund sustainable transportation systems. However, it is also acknowledged that mayors and decision-makers in these countries are unaware often of best practices, and also how to finance them. Meanwhile, there are many good practices developed and implemented in Latin American and Eastern Asian countries. A notable solution is Bus Rapid Transit (BRT) in Brazil. China and Singapore are very active in the development and demonstration of electric vehicles, fully automated vehicles and other transport solutions. Therefore, there is also much to learn from Latin American countries, China and Singapore. Cooperation has been moved from the traditional one way (i.e. Europe to help development in Latin American/China) to the two-way cooperation in order to gather the best human resources to develop and implement more sustainable transport solutions.
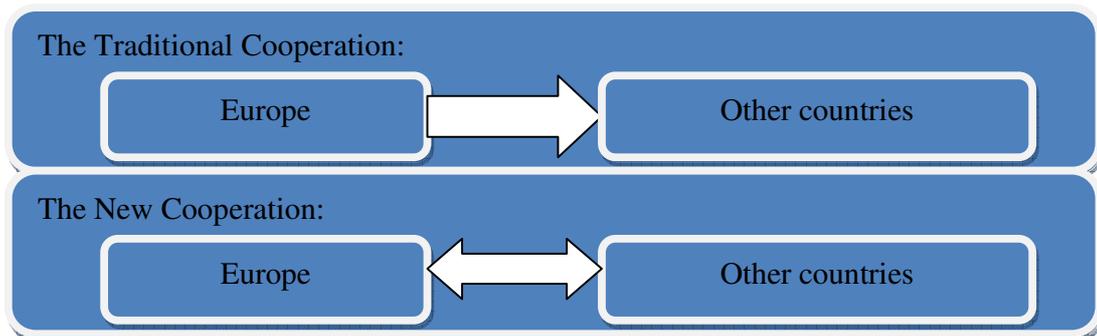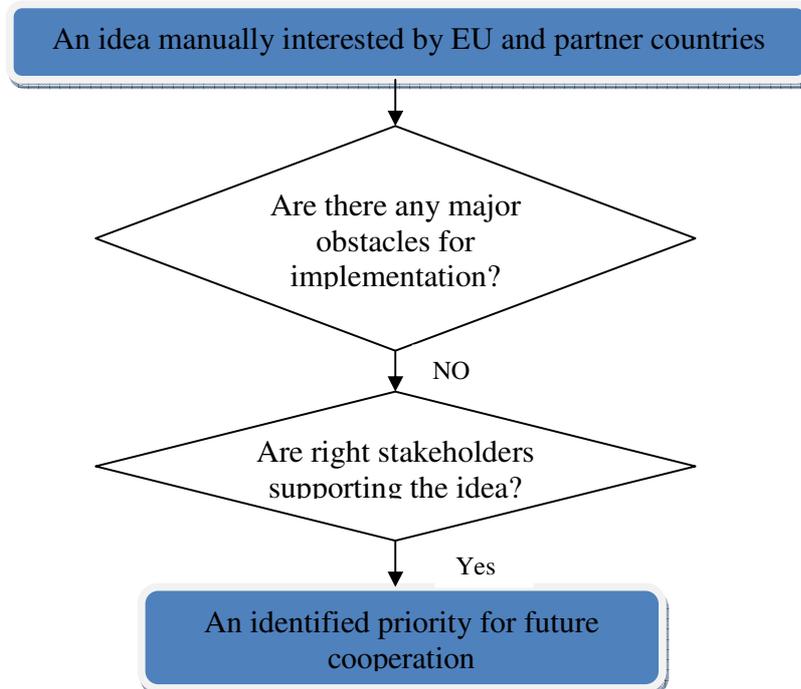

This document proposes a series of recommendations for future research to continue cooperation with Latin American, China and Singapore in order to achieve more sustainable mobility in the future globally.

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[1] United Nations (2012) Statistical Yearbook for Latin America and the Caribbean. Santiago, Chile: United Nations

2. Challenges and Enablers to Fostering Cooperation with Latin American and Eastern Asian countries

Due to difference in culture, social demography, political structure and economy in countries of the European Union, different countries may have different roadmaps and priorities to achieve more sustainable urban mobility. It has been acknowledged[2] that one of main obstacles for international cooperation is lack of knowledge on priorities in different countries. Therefore, identifying mutual interests of EU and partner countries in urban mobility have been carried out by bringing together experts from European and international organisations to exchange knowledge and to understand needs in different cities and countries. Different social, political and economic situation may hinder the implementation despite mutual interest in a particular field. Thus, it is important to assess the potential to transfer an idea or concept from one city to another. Implementation of an idea also will depend on the current network of stakeholders. Building a network with right stakeholders is a foundation for any cooperation projects. It is inefficient to find needed stakeholders after a project starts since making contacts and building trust for working together often take years. It is essential to understand what kind of stakeholders are needed to implement an idea or solutions and to verify if right stakeholders are in contact and if they express their interests in supporting a cooperation project. The methodology to make recommendations for future cooperation therefore can be summarised in three steps:

An idea manually interested by EU and partner countries

Are there any major obstacles for implementation?

NO

Are right stakeholders supporting the idea?

Yes

An identified priority for future cooperation

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[2] SIMBA (FP6) and SIMBA II (FP7) projects

3. Recommendations for innovative and sustainable urban mobility solutions

An amalgamation of the findings from both Viajeo-Plus and SOLUTIONS thus far has led to a series of recommendations in this deliverable. These recommendations identify areas that can potentially deliver high impact solutions to the current urban mobility and economic challenges faced, especially those in Latin American Eastern Asian countries.

For each research area/recommendation, the title is shown, with the full description shown in the Chapter 4:

Theme 1: Public & non-motorised transport modes

A number of recommendations have been proposed regarding future research areas for public transport and non-motorised modes. Understanding how to develop a higher quality, higher capacity and intelligent public transport system will be crucial in encouraging modal shift from private to public and non-motorised transport, to allow urban journeys to be made in a safer and more sustainable manner. These recommendations are listed below:

- 1.1 Public transport Smart Card data mining and analysis
- 1.2 Transferability of transport solutions to medium-sized cities
- 1.3 Bicycle sharing systems
- 1.4 Public transport organisation / integration
- 1.5 Bus priority measures and BRT systems
- 1.6 Clean vehicles for public transport

Theme 2: Optimising transport modelling and data use

Advanced modelling using existing data to maximise the capacity and quality of the transport network as a whole is always a cost-effective approach to improve efficiency of urban transport management, reduce congestion and emission from road transport. The benefits of optimising transport modelling and data use have been recognised by Latin American countries and China. Europe has been seen as advanced in this area. Stakeholders in Latin America and China are keen to learn European experiences on transport modelling and data use. Some recommendations are proposed on this theme:

- 2.1 Traffic operation evaluation through the Traffic Performance Index
- 2.2 Traffic modelling and simulation based on massive traffic data
- 2.3 Optimising sustainable urban mobility though integrated modelling and assessment of innovative and green transport solutions

Theme 3: Research on mobility solutions for future generations of the elderly

A further area of great importance is that of mobility solutions for future generations of elderly citizens. Disruptive demographics of an aging society will shape the future technologies and products, and special solutions for transport are required to allow elderly citizens to retain a high quality of life. Europe and China should cooperate on development of new solutions to address challenges of this social trend.

There exist some research projects to address this issue (e.g. GOAL-project), although they are mainly aimed at finding solutions for the current elderly people. However, future generations of elderly citizens, many of who use smart phones already for mobility and navigation services may take advantages of using smart phones to reduce negative impacts of reduced physical and mental competences. Research may be funded to look into the current technologies and user behaviours into mobility solutions, to help industry and society prepare to adapt to the needs of future generations of elderly citizens.

Moreover, elderly drivers are more likely to hurt themselves and put others at risk. The fatality rate for drivers over 75 is more than five times higher than the average, and their injury rate is twice as high. This higher vulnerability is due to the reduced physical abilities of older drivers (i.e. diminished eyesight and hearing, slower reaction time etc). Although previous research funded by the EC have already addressed this issue, a new research to look into new and emerging technologies (particularly related to in-vehicle technologies) is needed.

As such, four recommendations on potential areas of research have been developed, also with the full description shown in Chapter 4:

- 3.1 Study of potential mobility solutions based on Smartphone and social media for future generation of elderly;
- 3.2 Study of driver behaviour changes associated with age, thus identifying gaps in current technologies or products of Advanced Driving Assistance Systems;
- 3.3 Study on specifically designed vehicle, i.e. fully automated vehicle, for aging society and demonstration of use fully automated vehicles for elderly people
- 3.4 Development of collective and demand-responsive transport services for elderly based on social networking platforms

Theme 4: Sustainable Urban Mobility Plans (SUMP)

Active participation by all stakeholders in sustainable development is essential. At European level several initiatives have evolved to promote the broad introduction of sustainable urban mobility planning. To underline its significance, the European

Commission put sustainable urban mobility planning as the first action of the Action Plan on Urban Mobility in 2009. The importance is reiterated in the Transport White Paper 2011, by demanding that "cities should be encouraged to develop Sustainable Urban Mobility Plans SUMPs)". The 2013 EU Urban Mobility Package puts SUMP at the heart of urban mobility policies and a SUMP coordination platform will steer SUMP activities at the European level. Key to successful SUMP development is that they must integrate all modes used, they should consider the broader social, environment and economic aspects and they should have a strong participatory nature with a variety of stakeholders, local citizens and key interest groups being consulted.

The European Commission-supported SUMP Guidelines provide European cities and regional/national authorities with guidance for implementing a sustainable urban mobility planning process. These guidelines are being adapted to the specific situations in other regions in the world, for example, they are being adapted to the local context by EMBARQ for the Latin-American context. In Brazil, the development of SUMPs is been made mandatory for large and medium-sized cities China and the North African countries have also shown interest in transfer of the guidelines. A systematic approach to mobility policy and planning is gaining recognition amongst Chinese mayors. The SUMP concept presented in the EU-China Green Urban Mobility workshop was well received; a number of Chinese researchers and city officials acknowledged the need to adopt a more participatory planning approach and emphasised the opportunity for knowledge exchange between Europe and China in this area.

There is a huge potential to bring the concept of SUMP to cities Latin America and Asia. Due to different political context the SUMP concept might be only partly transferable to cities in China. Integrating some aspects of SUMP might already to positive effects on the urban mobility planning in these regions.

Priorities of cooperation include knowledge sharing, capacity building and networking activities. Besides the general preparation of a SUMP, it was revealed during the project that the cities are in particular interested in a number of other SUMO-related activities, which should also be investigated further. As such, four areas of research have been suggested, which are shown below:

- 4.1 General preparation of a SUMP
- 4.2 Stakeholder coordination and involvement in integrated planning / SUMPs
- 4.3 Public Participation in integrated planning / SUMPs
- 4.4 Monitoring and evaluation in SUMP

Theme 5: Research on future framework for urban transport

Since urbanisation and motorisation are rapidly increasing in Latin American and many Asian countries, more work is needed to understand to a greater depth the changes that will occur. This will include demographic changes and technological changes. Research projects could be used to forecast such long-term changes, to allow vehicles

and urban mobility solutions to develop to meet such future needs. Such research will help European industry to prepare themselves for future challenges and develop products needed by the global market, thus ensuring European industry's future competitiveness. Three topics have been proposed:

- 5.1 To explore and support the development of step-change technologies for road vehicles
- 5.2 To understand the socio-economic characteristics of cities within Latin American and Eastern Asian countries and future needs for urban mobility
- 5.3 Development of a roadmap to forecast demographic and technological evolution within Latin American and Eastern Asian Countries over the coming decades

Theme 6: Financing sustainable urban transport

In times of constrained budgets, financial resources for sustainable transport are often lacking. Different modes are competing for the limited transport budget. The financing structure can encourage for discourage the development of a sustainable urban transport system. For instance in China, funding provided by the central government for local transport investments is mainly allocated to road infrastructure investments or prestigious projects. However, the funding for operation and maintenance is not always provided to the required extent. Financing structures vary between regions as well does the potential to raise additional revenues. Many cities are looking for innovative ideas to finance sustainable transport, while limiting the costs to the users, which are often very price sensitive. As such, two areas for research have been proposed:

- 6.1 Financing public transport

- 6.2 Financing infrastructure for non-motorized-modes

Policy Objectives & technical areas of the Recommended Priorities

Priority		Policy Objectives				
		Cost Efficiency	Modal shift	Social inclusion	Environmental sustainability	Competitiveness
Public transport & Non-Motorised Transport mode	1.1 Public transport Smart Card data mining and analysis	X	X		X	
	1.2 Transferability of transport solutions to medium-sized cities		X		X	
	1.3 Bicycle sharing systems		X	X	X	
	1.4 Public transport organisation / integration		X	X		
	1.5 Bus priority measures and BRT systems		X		X	
	1.6 Clean vehicles for public transport	X			X	X
Urban Sustainable Transport Management	2.4 Traffic operation evaluation through the Traffic Performance Index	X			X	
	2.5 Traffic modelling and simulation based on massive traffic data	X			X	
	2.6 Optimising sustainable urban mobility though integrated modelling and assessment of innovative and green transport solutions	X			X	X

Mobility solutions for future generations of the elderly	3.1 Study of potential mobility solutions based on Smartphone and social media for future generation of elderly		X	X		X
	3.2 Study of driver behaviour changes associated with age, thus identifying gaps in current technologies or products of Advanced Driving Assistance Systems			X		X
	3.3 Study on specifically designed vehicle, i.e. fully automated vehicle, for aging society and demonstration of use fully automated vehicles for elderly people			X		X
	3.4 Development of collective and demand-responsive transport services for elderly based on social networking platforms		X	X		X
SUMP	4.1 General preparation of a SUMP	X	X	X	X	
	4.2 Stakeholder coordination and involvement in integrated planning / SUMPs	X	X	X	X	
	4.3 Public Participation in integrated planning / SUMPs	X	X	X	X	
	4.4 Monitoring and evaluation in SUMP	X			X	
Future Framework	5.1 To explore and support the development of step-change technologies for road vehicles	X			X	X
	5.2 To understand the socio-economic characteristics of cities within Latin American and Eastern Asian countries			X	X	X
	5.3 Development of a roadmap to forecast demographic and technological evolution within Latin American and Eastern Asian countries over the coming decades	X		X		X
Financing sustainable urban	6.1 Financing public transport	X		X	X	
	6.2 Financing infrastructure for non-motorized-modes	X	X	X	X	

Chapter 4: Recommendations

Theme 1: Public & Non-Motorised Transport Modes

Recommendation 1.1: Public transport Smart Card data mining and analysis

Motivation

The recent development of passive data collection techniques (e.g. Automated Fare Collection and Automated Vehicle Location) has shifted a data-poor environment to a data-rich environment. Many urban areas use various types of smart card technology, including London (Oyster Card), New York City (MetroCard) and Beijing (Beijing Transportation Smart Card).

Analysis of the data from such systems can provide a wealth of information to relevant stakeholders including Local Authorities and operators. However, to date, the full potential exploitation of this data has not been realised, with many cities unsure how to fully utilise it.

Activities

- Integration of different data streams that complement smart card data (e.g. location data; meteorological data, pollution data)
- Development of common interfaces compliant with existing standards for data exchange
- Methodologies for accelerated deployment of such schemes
- Development of Proof of Concept demonstrators.

Expected impacts:

- Understand how it can be used to understand mobility patterns, and hence influence future sustainable transport policy and an optimised use of resources

Target countries/regions:

- Brazil, China, Singapore

Type of project: RIA (Research and Innovative Actions); Demonstrations

Partners:

- Local Authorities and PT operators in target countries.
- Industrial Partners
- Research Institutes in Europe and target countries
- End User Representation

This recommendation covers the following areas:

X	Network and mobility management
	Clean vehicles
	Infrastructure
	Logistics
X	Public transport
X	Integrated Planning

Source of the recommendation: Viajeo Plus Consortium - Beijing Transport Research Centre (BTRC)

Recommendation 1.2: Transferability of transport solutions to medium-sized cities

Motivation

A high percentage of the population of Latin America and China lives in medium-sized cities (with populations between 100k and 3 million). Such cities generally attract far less research attention than larger (more iconic) cities (so-called "megacities") for dealing with transport problems such as congestion, poor public transport, pollution, lack of safety and inadequate integrated land-use/transport planning.

Furthermore, whilst medium-sized cities in Latin America and China frequently have high growth rates, they typically have low levels of planning capability/resources (in terms of local authority personnel and finance). Given this situation, an important research question concerns how proven transport solutions developed in larger higher-resourced cities can be transferred to medium-sized lower-resourced cities.

Techniques for transferability need to take into account the existence of a variety of local barriers (including economic, cultural, topographical and administrative barriers) whilst recognising that there is inevitably a challenge in transferring solutions from resource-rich cities (who have built up their transport infrastructure and services over 100+ years) to poorer cities whose transport infrastructure is not well developed.

Activities

- Construction of theoretical approaches (conceptual, quantitative, qualitative and hybrid) as to how to deal with transferability between medium-size cities
- Development of transferability techniques and tools (visual tools, participation approaches, scaling-up, data fusion, tools for *a priori* measurement of potential transferability etc) and guidelines to indicate which tools are appropriate in different situations
- Development of a methodological framework for the practical application and validation of transferability theory/techniques
- Application and assessment of framework and techniques/tools in case studies, making adjustments on the basis of such experiences
- Widespread dissemination of resulting framework and techniques/tools, including the provision of training for transport planners in medium-sized cities.

Expected impacts:

- Improved transport planning in medium-sized cities;
- Improved quality of life in medium-sized cities
- Increased modal shift towards public transport and non-motorised modes

Type of project: CSA (Coordination and Support Actions) and/or RIA

Target countries: Latin America and China

Partners: Research institutes, European cities, target country cities, NGOs

This recommendation covers the following areas:

X	Network and mobility management
	Clean vehicles
X	Infrastructure
	Logistics
X	Public transport
X	Integrated Planning

Source of the recommendation: Viajeo Plus Consortium - ITS Leeds

Recommendation 1.3: Bicycle sharing systems

Motivation:
There is rapidly growing interest in the development of infrastructure and systems for sustainable transport modes such as walking and cycling. In Europe, the modal share of cyclists experienced significant increases in recent years. Besides improvements in cycling infrastructure (cycling path, bicycle parking facilities), innovative concepts like bicycle sharing system contribute to successful cycling promotion. China traditionally had a very high modal share of cycling; the current challenge is to maintain or regain this share. Also in some Indian cities bicycle ownership rate is high. However, in some Asian cities experience a decline in cycling. In Latin America, the role of cycling varies largely between cities.

Rental bicycle systems can be promising solution to solve the 'last mile' problem in urban transport systems and provide truly door-to-door travel connections. Bike-sharing systems can be an attractive alternative to car or taxi travel in heavily congested areas. They also provide a means of transport for populations in high-density residential areas where residents have limited possibilities to safely park and store private bicycles. An increased integration of bike sharing services into local public transport provides the "missing link" in transport networks and secondly eases the burden of public transport at peak times. Numerous cities of different sizes have implemented bike rental systems. In Paris, the bike rental system Vélib has a fleet of 20,600 bikes and 1,800 stations.

In China, bike-sharing systems are spreading rapidly across cities. No bicycle-sharing initiative has yet been able to operate on revenues from membership fees and user charges alone. Therefore, bicycle-sharing facilities use co-funding from public sources. Bike-sharing schemes may be managed by city governments, non-profit organisations or in public-private partnership. There are also some public transport providers running bike sharing systems. Technology in public bike sharing solutions is moving fast, with e-bikes for sharing or cyclo-logistics (bicycles to transport goods or children) now being implemented into bike sharing schemes.

Proposed activities
- Research on how to establish successful business models for bicycle sharing systems or innovative financing for bicycle sharing systems
- Cooperation in technology development for bike sharing systems
- Sharing experience on the design of bicycle sharing systems (location, accounting system, infrastructure)

Expected impacts:
- Increased awareness of cycling
- Induce a mode shift towards Non-Motorised Transport modes and public transport

Target countries/regions: Latin America, Asia/China,

Partners: research institutes from Europe, LA and Asia/China, cities, international organisations.

This recommendation covers the following areas:

X	Network and mobility management
	Clean vehicles
X	Infrastructure
	Logistics
	Public transport
X	Integrated Planning

Source of the priority: SOLUTIONS consortium partners

Recommendation 1.4: Public transport organisation/integration

Motivation:
An integrated public transport system can offer a higher quality and comfort level. Integrated planning of the public transport network ensures high connectivity and avoids fragmented competences. Integrated ticketing systems for public transport are one of the basic conditions required to provide convenient access to a public transport system in a city. Integrated fare systems are now commonplace in Europe and are spreading in China; experience can be shared and promoted among other cities along with experience from other parts of the world.

The barriers are the need for cooperation between a number of different authorities and operators, and difficulties arising from revenue sharing, interoperability and data protection issues. Furthermore, in Europe, integrated transport authorities, which oversee public transport, infrastructure and planning have been established in London and Budapest. Similar approaches were adopted in Stockholm, Curitiba and Hefei and Yinchuan.

Proposed activities
- Sharing international experience with integrated ticketing and revenue sharing
- Technical improvements in integrated ticketing systems
- Show-casing best practices

Expected impacts:
- Better coordination between different public transport systems
- More attractive public transport systems
- Spread of technical solutions for integrated ticketing

Target countries/regions: Latin America, China

Partners: research institutes from Europe, LA and China, public transport authorities and operators, technical infrastructure providers for integrated tickets

This priority covers the following areas:

	Network and mobility management
	Clean vehicles
	Infrastructure
	Logistics
x	Public transport
	Integrated Planning

Source of the priority: SOLUTIONS consortium partners

Priority 1.5: Bus priority measures and BRT systems

Motivation:
Bus priority (e.g. achieved by dedicated bus lanes and/or prioritization at traffic signals) allow the speed of buses to be maintained to that they run to schedule, making services more reliable and helping to deliver fuel savings. The aim of bus priority is to increase the average speed of public transport buses in cities and to provide passengers with more reliable journeys and can be a first step towards a more sophisticated BRT system. Bus Rapid Transit (BRT) mimics a metro system, by using regular buses on city streets, but on dedicated lines, with relatively large capacity and high average speeds.

As such, public transport is given clear preference on the urban road network and a reliable public transport service can be provided at a fraction of the cost of a metro system. Approximately 160 cities across 38 countries have BRT systems or priority bus corridors. The concept was develop in Latin America and has spread very fast across the continent, but also Asia, North America and Europe and more recently also Africa. While there are a number of success stories to explore in this area, there are also some cases were the introduction of BRT systems has not been so successful. Uncovering both the successes and the failures, and their underlying factors, will is equally important in better understanding the transferability of BRTs.

Proposed activities
- Exchange between Europe and the target regions on technology and policy issues as well as on operational and funding structures
- Research on the causes of failed BRT systems

Expected impacts:
- Provision of low cost but high capacity and high quality public transport for medium sized cities in the target regions

Target countries/regions: Latin America, China

Partners: research institutes from Europe, LA and China, ITS providers, equipment providers

This priority covers the following areas:

X	Network and mobility management
	Clean vehicles
	Infrastructure
	Logistics
X	Public transport
	Integrated Planning

Source of the priority: SOLUTIONS consortium partners

Recommendation 1.6: Clean vehicles for public transport

Motivation:

Clean vehicles have the potential to decreasing harmful local pollution and greenhouse gas emissions and can contribute to enhance energy security. Due to fixed routes, limited operational radius and high annual mileage of vehicles fuel switch is often easier and more cost-effective for public transport vehicles than for private cars. A switch to CNG was implemented mainly due to air quality concerns in many cities worldwide (e.g. Delhi, Berlin, Guiyang). In Latin America, biofuels play an important role. Offering zero emissions at the vehicle level, more and more cities are interested in electric and hybrid electric vehicles for public transport. Electric and hybrid electric buses are used in some cities in China and are also tested in European cities. Electric buses are developed by Chinese and European manufactures. The switch to alternative fuels requires considerable investments in vehicles and in refuelling/charging infrastructure. Thus, it is essential that the cities select a cost effective option promising considerable benefits. Holistic cost-benefit analysis of different options including also wider effects such as passenger comfort and noise pollution can assist cities in selecting an appropriate technology.

Proposed activities

- Research and knowledge dissemination on the well-to-wheel (WtW) emissions of different fuel options
- Research cooperation on electric bus development and inductive charging
- Holistic assessment (wider costs and benefits – including WtW emission) for different technological options
- Exchange of experience from pilots and demonstration projects with electric buses

Expected impacts:

- Technological advances in clean vehicles (in particular electric ones) for public transport
- Enhanced and accelerated uptake of new technological options
- Better knowledge on the operational characteristics of electric buses and charging infrastructure

Target countries/regions: Latin America, China

Partners: research institutes from Europe, LA and China, vehicle manufacturers, infrastructure suppliers

This priority covers the following areas:

	Network and mobility management
x	Clean vehicles
	Infrastructure
	Logistics
x	Public transport
	Integrated Planning

Source of the priority: SOLUTIONS consortium partners

Theme 2: Optimising Transport Modelling & Data Use

Recommendation 2.1: Traffic operation evaluation through the Traffic Performance Index

Motivation

Traffic Performance Index (TPI) highlights the current state of congestion on roads within a city, to provide a more even spread of vehicles throughout the roads within a city and hence relieve congestion. This is commonly available as an online service and through mobile telephones, with weekly updates printed in local newspapers as has been documented in Chinese cities (e.g. Beijing). The trial in Beijing resulted in the reduction of journey times within the cities between 2010 and 2011, leading to economic benefits (due to greater productivity) and environmental benefits (reduced congestion)

To maximise the benefits of Traffic Performance Indices in cities suffering from heavy congestion, further research is needed to realise the full potential of this index. Knowledge transfer to cities with similar characteristics can further contribute to this process.

Activities

- Understanding how users of the system currently interact with it (Online, Tablet, Smartphones, etc)
- Trialling system in new cities
- Develop suitable methodologies using TPI tools to deliver sustainable urban transport solutions and an optimised use of resources.

Expected impacts:

- Better informed transport policies leading to future sustainable operations.
- Greater optimisation of transport resources within cities

Target countries/regions: Latin America, China, Singapore, MPC, Europe

Type of project: RIA; Demonstrations; CSA

Partners:

- Local Authorities and PT operators in Target countries
- Research Institutes in Europe and Target countries
- End User Representation

This recommendation covers the following areas:

X	Network and mobility management
	Clean vehicles
	Infrastructure
	Logistics
X	Public transport
X	Integrated Planning

Source of the recommendation: Viajeo Plus Consortium member - Beijing Transport Research Centre (BTRC)

Recommendation 2.2: Traffic modelling and simulation based on massive traffic data

Motivation

The next challenge for traffic modelling is to develop full real-time capabilities. To achieve this vision, it is necessary to develop more agile techniques and tools capable of handling large amounts of data in real-time, to allow for the accurate prediction of future traffic situations.

Activities

- Knowledge transfer between traffic modellers worldwide
- Development of simplified tools and techniques
- Proof of concept demonstrations

Expected impacts:

- Improved traffic management and planning, leading to greater integration between traffic modelling streams and reduced congestions.

Target countries/regions: Latin America, China

Type of project: Research and Innovation Actions; Demonstrations; Coordination and Support Actions

Partners:
- Local Authorities and PT operators in Target countries
- Industrial Partners
- Research Institutes in Europe and Target countries
- End User Representation

This recommendation covers the following areas:

	Network and mobility management
	Clean vehicles
	Infrastructure
	Logistics
X	Public transport
	Integrated Planning

Source of the recommendation: Viajeo Plus Consortium member - Beijing Transport Research Centre (BTRC)

Recommendation 2.3: Optimising sustainable urban mobility though integrated modelling and assessment of innovative and green transport solutions

Motivation

The project will aim to develop, demonstrate and validate a dynamic (through feedback loops) predictive model for the evaluation and assessment of best practice and solutions in the area of network management, clean vehicles, public transport, transport infrastructure, and city Logistics. The proposed model is highly aggregated (which will make it very attractive in contexts where there is not a huge amount of person-power for data collection and calibrating more detailed models).

The proposed research should take into account the findings and experience of previous and on-going EU research activities on policy interventions and build on existing modelling work resulting from international cooperation especially with Latin America, China and Singapore. The proposed model will be used to support policy development for sustainable global growth and employment.

Activities:

- Developing a 'one-stop shop' modelling and assessment framework for innovative solutions to be evaluated within an integrated environment;
- Identifying the key drivers/indicators required for best solutions to be evaluated with particular emphasis on the socio-economic, social and cultural variations;
- Specifying quality assurance strategies for data collection from multiple sources in particular from cost-effective providers (e.g. mobile apps, crowd-source, Twitter, Facebook);
- Designing policy interventions that help achieve multiple objectives and avoid those that solve one transportation problem but exacerbate others;
- Evaluating the combined effectiveness and efficiency of best practice and solutions, testing new transport and mobility concepts;
- Identify the enablers and barriers for accelerated implementation and uptake of best solutions in different regions (e.g. Europe, Latin America, China, Singapore and MPCs);
- Developing executive implementation plans and training materials for structured transfer of the proposed decision support system between cities/regions.

Expected impacts:

- Creation of an interoperable modelling and assessment environment to identify the combination of best solutions and optimise sustainable urban mobility;
- Facilitations of uptake of new technologies in order to accelerate the implementation and uptake of a clean, energy efficient, safe and intelligent transport system;

- Support policy development for sustainable global growth and employment and strengthen European ITS industry's competitiveness.

Type of project: Research and Innovation Actions (RIA)

Target countries: Latin America, China, Singapore

Partners: Universities, research institutions, traffic & transport industry, public authorities, service providers

This recommendation covers the following areas:

X	Network and mobility management
	Clean vehicles
	Infrastructure
	Logistics
	Public transport
X	Integrated Planning

Source of the recommendation: Viajeo Plus Consortium Member - ITS Leeds

Theme 3: Research on mobility solutions for future generations of the elderly:

Recommendation 3.1: Study of potential mobility solutions using Smartphone and social media for future generation of elderly;

Motivation

Smartphone can provide a great tool for addressing the issue related to reduced physical and mental competences of elderly people. Whilst it may not be easy to teach the current generation of elderly people how to use Smartphones, the future generations, however, who are used to use Smartphone can benefit greatly from using this technology, particularly in combination with social media. Such research may therefore look into the current usage of Smartphone and social media in mobility services and the characteristics of elderly people and provide an analysis of this.

Activities:

- Surveys on current usage of Smartphone and social media for mobility services among 50 – 65 years old
- Analysing potential impacts of aging characteristics on the current services;
- Understanding needs of adaptation of current services for elderly people;
- Proposing new services specifically designed to meet requirements of elderly people.

Expected impacts:
- To strengthen European industry's competitiveness for future market;
- To prepare better mobility services for future generations of elderly, thus improving quality of life;

Type of project: Coordination and Support Actions (CSA)

Target countries: China and Singapore

Partners: EC industry from IT and transport sectors, research institutes from Europe and China, influencing international organisations e.g. UN.

This recommendation covers the following areas:

X	Network and mobility management
	Clean vehicles
	Infrastructure
	Logistics
X	Public transport
	Integrated Planning

Source of the recommendation: Viajeo Plus Consortium Member – ERTICO; Tongji University, China

Recommendation 3.2: Study of driver behaviour changes associated with age, thus identifying gaps in current technologies and products of Advanced Driving Assistance Systems (ADAS);

Motivation

ADAS are intent to improve safety and enhance drivers' experience. The FP5 funded ADVISOR project (2000 – 2002) analysed the potential impact of ADAS on driving behaviour and road safety for senior drivers. Since then, there is little research into ADAS for older drivers. In the past decade, technologies of ADAS have been developed rapidly, providing many potential to further enhance safety of senior drivers and protect vulnerable road users.

Chinese citizens aged 50-65 are the first generation that drive cars in China. There is little knowledge and research into senior drivers' behaviours in China. The society, the automotive industry and the drivers themselves do not prepare for the forthcoming ageing generations who have driving license. It would not be surprising that the drivers will continue to use their cars despite physical constrains associated with age.

Activities

- Development of a comprehensive understanding of key characteristics and risk factors of senior driving behaviour;
- Analysing functionalities of current ADAS technologies and identifying what kind of products can be developed
- Publishing a white paper on recommendation for future development of ADAS for senior drivers
- Design, develop and test ADAS
- Public demonstration of use of ADAS for senior drivers
- Dissemination of best practices to improve senior drivers' safety

Expected Impacts:

- To understand future market needs and facilitate development of new technologies in order to strengthen European automotive industry
- To improve overall road safety and reduce traffic causality in EU and China
- To raise awareness of potential risks of senior drivers

Type of project: Research and Innovation Actions (RIA)

Target countries: China

Partners: EC industry, research institutes in Europe and China, international organisations e.g. ERTICO, FIA etc.

This recommendation covers the following areas:

X	Network and mobility management
X	Clean vehicles
	Infrastructure
	Logistics
	Public transport
	Integrated Planning

Source of the recommendation: Viajeo Plus Consortium Member – ERTICO; Tongji University, China

Recommendation 3.3: Study on specifically designed vehicle, i.e. fully automated vehicle, for aging society and demonstration of use fully automated vehicles for elderly people

Motivation

Since 2000, EC has funded a number of different types of projects (R&D, demonstration, CSAs etc) on vehicle automation such as CityMobil, CityMobil2, CyberCar/CyberMove etc. Many different protocols vehicle were developed and demonstrated. There is also much research into vehicle automation in China. It has been proposed to use automated vehicles for senior people's transport. One cooperation project between China and Japan is a trial of using fully automated electric vehicles to provide transport for elderly in care-homes. Such trials have advantages in development of automated vehicles since it will not be mixed with other type of traffic and on private roads. Chinese researchers are interested in cooperation with Europe on vehicle automation, particularly in addressing provision of transport services to elderly people. Moreover, fully automated electric vehicles can significantly reduce traffic pollutions which are key problems in many Chinese cities.

Activities

- Understanding mobility needs for elderly people and analysing how can automated vehicles meet such needs
- Adapting existing protocol vehicles to address such special needs
- Public demonstration of fully automatic vehicles for elderly users with reduced mobility
- Collecting feedbacks on suggestion for future development
- Initiating cooperation between EU-China on standardisation and legal framework of vehicle automation technologies

Expected Impacts:

- To facilitate deployment of automated vehicles and helping European automotive industry to understand the global competitions on vehicle automation
- To enhance cooperation in vehicles automation technologies between EU and China
- To improve quality of life for elderly people

Target countries: China, Japan

Type of project: Research and Innovation Actions (RIA), demo and Coordination and Support Actions (CSA)

Partners: EC industry, research institutes in Europe, China and Japan, social service providers

This recommendation covers the following areas:

X	Network and mobility management
X	Clean vehicles
	Infrastructure
	Logistics
	Public transport
	Integrated Planning

Source of the recommendation: Viajeo Plus Consortium Member – ERTICO; Tongji University, China; VRA project

Recommendation 3.4: Development of collective and demand-responsive transport services for elderly based on social networking platforms

Motivation

Collective and demand-responsive transport services for elderly have been available for a number of years. It may however be improved by using social network platforms. It may be particularly useful in the future when the current 'Smartphone generation' become elderly. There are currently many mobility services available on Smartphone or social media such as car-sharing and ride-sharing (some of them may be controversy, e.g. Uber). However, it is no doubt that such services provide an alternative solution and often reduce travel costs for travellers. Such services would be an excellent transport mode to fill in the gap between public transport and private cars.

Activities

- Understanding mobility needs for elderly people in terms and analysing how can a demand responsive transport service meet such needs
- Developing human-machine interface (HMI) which are more friendly use for elderly
- Demonstration of such services in a number of cities (small and middle sizes cities with limited public transport services
- To raise awareness of the social challenges among IT and traveller information providers

Expected Impacts:

- To improve mobility services for elderly people and reduce social exclusion due to age and reduced individual competences
- To discover use of social media to address social and mobility challenges associated with the aging society
- To raise awareness of such mobility challenges and encourage more services (Smartphone or social media based) to elderly

Type of project: Research and Innovation Actions (RIA), demo and Coordination and Support Actions (CSA)

Target countries: China, Singapore

Partners: IT industry, research institutes, user organisations

This recommendation covers the following areas:

X	Network and mobility management
X	Clean vehicles
	Infrastructure
	Logistics
	Public transport
	Integrated Planning

Source of the recommendation: Viajeo Plus Consortium Member – ERTICO; Tongji University, China; VRA project

Theme 4: Cooperation on Sustainable Urban Mobility Planning

Recommendation 4.1: General preparation of a SUMP

Motivation:
Cities in the target regions experienced a rapid and partly chaotic growth over the past decades and most are still expanding crossing municipal boarders. SUMP can significantly contribute to a better and more sustainable urban transport system in these cities.
The objective of a SUMP is to create a comprehensive basis for long-term mobility planning in an urbanised area. A Sustainable Urban Mobility Plan (SUMP) is applied for the entire urban area (including peri-urban/urbanised region). The characteristics of a SUMP are:

- a pledge of sustainability,
- the involvement of stakeholders and citizens in a structured collaborative process,
- the implementation of integrated packages of measures including different
- types of instruments (planning, technical, pricing, information etc.),
- coordination of the process regarding project timeline, spatial coverage and
- participating institutions, and
- a focus on achieving measurable targets.

Proposed activities

- Establishing an international knowledge exchange network on SUMPs
- Training and capacity building for local practitioners in the target regions
- Development of tailor-made SUMPs guidelines for the target regions
- Dissemination of best practices in SUMP
- Organising conferences and workshops to invite European cities to present their experiences to local stakeholders such as government officials, city representatives, transport planner and engineers

Expected impacts:
- More sustainable transport planning in the cities implementing SUMP
- Positive influence on the planning process (public participation, stakeholder integration)
- Increased awareness of long-term effects of (unsustainable) transport planning

Target countries/regions: Latin America, Asia/China

Partners: research institutes from Europe, LA and Asia/China, cities, international organisations e.g. UN, EUROCITIES

This priority covers the following areas:

	Network and mobility management
	Clean vehicles
	Infrastructure
	Logistics
	Public transport
x	Integrated Planning

Source of the priority: SOLUTIONS consortium partners

Recommendation 4.2: Stakeholder coordination and involvement in integrated planning / SUMPs

Motivation:
Sustainable urban mobility planning can only be successful if different mobility related stakeholders (operators, providers, users) are involved in the planning process. The SUMP planning-cycle requires well-structured involvement of the relevant stakeholders throughout key stages of the process. The participation of actors from beyond city boundaries is equally relevant. Involving different government sectors helps to work across administrative boundaries, which is highly relevant in cities spreading beyond their boundaries. Many cities participating in the solutions project face challenges in integrating different transport providers to work on a joint strategy. Cities were highly interested in the 'mobility pact', which the city of Barcelona defined among its mobility related stakeholder in already 1998. In many cities of the target region informal public transport plays a major role and has to be integrated in the process as well.

Proposed activities
- Training and knowledge exchange on means to anchor stakeholder involvement in the planning process
- Dissemination of best practice examples of stakeholder participation

Expected impacts:
- Better integration of different transport providers
- Accelerated implementation processes

Target countries/regions: Latin America, Asia/China

Partners: research institutes from Europe, LA and China, international organisations e.g. UN, cities, transport operators

This priority covers the following areas:

	Network and mobility management
	Clean vehicles
	Infrastructure
	Logistics
	Public transport
x	Integrated Planning

Source of the priority: SOLUTIONS consortium partners

Recommendation 4.3: Public Participation in integrated planning / SUMPs

Motivation:
Citizen engagement is a key component of sound sustainable urban mobility planning. The planning-cycle requires well-structured involvement of the relevant stakeholders throughout key stages of the process. The involvement of citizens seeks to ensure a broad acceptance of transport and mobility measures. Participation of citizens ensures that urban transport and mobility measures reflect the needs of different user groups. Often, especially the low-income families have only limited access to mobility in the target regions. In some Latin American countries public participation has been integrated in major urban public transport developments (e.g. Trans-Milenio, Bogota)

Proposed activities
- Training and knowledge exchange on participatory processes and useful methods
- Knowledge exchange on the legislative framework for public participation

Expected impacts:
- More people oriented mobility systems
- Better integration of the needs of different user groups (e.g. low income families, woman, mobility impaired)

Target countries/regions: Latin America, partly applicable to Asia/China

Partners: research institutes from Europe, LA and Asia/China, international organisations e.g. UN, cities, citizen association

This priority covers the following areas:

	Network and mobility management
	Clean vehicles
	Infrastructure
	Logistics
	Public transport
x	Integrated Planning

Source of the priority: SOLUTIONS consortium partners

Recommendation 4.4: Monitoring and evaluation in SUMP

Motivation:
Monitoring and evaluation is a condition for a successful sustainable urban mobility planning cycle. Evaluation and monitoring is applied to various steps, such as measure selection and implementation, as well as the assessment of the entire plan. This encompasses a wider range of evaluation methodologies, such as impact and process evaluation, allowing the quantification of high level objectives such as climate change or quality of life, as well as specific objectives, such as change in modal split or cost benefit of measures. Thereby, monitoring can reveal the long-term benefits of sustainable urban mobility measures. Often, monitoring and evaluation is inhibited by a lack of expertise and a lack of structured data. This is closely linked to transport modelling, which can generate useful mobility-relevant data and can provide decision-support for measure selection and planning.

Proposed activities

- Training and capacity building on evaluation methods
- Knowledge exchange on evidence for the costs and benefits of sustainable urban transport measures
- Sharing technical expertise in modelling (adaptation of existing modelling software to the target region)

Expected impacts:
- Better understating of the necessity of monitoring and evaluation
- Encouraging the implementation of sustainable transport measures
- Better urban transport planning in cities (improvements in the selection, design and readjustment of measures)

Target countries/regions: Latin America, Asia/China

Partners: modelling experts, software providers, research institutes from Europe, LA and Asia/China

This priority covers the following areas:

	Network and mobility management
	Clean vehicles
	Infrastructure
	Logistics
	Public transport
x	Integrated Planning

Source of the priority: SOLUTIONS consortium partners

Theme 5: Research on Future Framework For Urban Transport

Recommendation 5.1:   To explore and support the development of step-change technologies for road vehicles

Motivation

The development and exploitation of step-change technologies in Latin American and Eastern Asian countries can lead to the development of zero-emissions vehicles and a maximised capacity within the remit of existing infrastructure, whilst delivering significant economic benefits. Such technological solutions can be implemented in both private and public transport (including affordable mass transit), last-mile delivery of freight and to develop the smart integration of vehicles and infrastructure to improve the safety and efficiency of road transport.

Activities

- To understand the level of infrastructure needed to deploy such novel technologies

- To understand the level of integration required between this infrastructure and future vehicles

- Proof of concept demonstrations

Expected impacts:

- Improved traffic management and planning, leading to greater integration between traffic modelling streams and reduced congestions.

Target countries/regions:

- Latin America, China

Type of project: Research and Innovation Action; Demonstrations

Partners:

- Local Authorities and PT operators in Target countries
- OEMs (including SMEs)
- Research Institutes in Europe and Target countries
- End User Representation

This recommendation covers the following areas:

X	Network and mobility management
X	Clean vehicles
	Infrastructure
	Logistics
X	Public transport
	Integrated Planning

Source of the recommendation: Viajeo Plus Consortium Member - Newcastle University

Recommendation 5.2: To understand the socio-economic characteristics of cities within Latin American and Eastern Asian countries and future needs for urban mobility

Motivation

The socio-economic differences between European and Topic One cities affect the likelihood of successful transferability, and so understanding the magnitude of these differences, and consequently how to circumvent them, will be crucial in developing innovative, sustainable transport systems in these countries.

Activities

- Consideration of the differences between Europe and Latin American and Eastern Asian countries with regards to the acceptability and understanding of novel technologies by society, policy-makers and industry and the infrastructure limitations and opportunities that can foster high-impact future collaboration.

Expected impacts:

- An increased likelihood of successful implementation of best practices to cities within Latin American and Eastern Asian countries

Target countries/regions:

- Latin America, China

Type of project: RIA; CSA

Partners (from both Europe and Topic 1 countries): Local Authorities and PT operators in Target countries, Research Institutes in Europe and Target countries, End User Representation

This recommendation covers the following areas:

	Network and mobility management
	Clean vehicles
	Infrastructure
	Logistics
X	Public transport
X	Integrated Planning

Source of the recommendation: Viajeo Plus Consortium member - Newcastle University

Recommendation 5.3: Development of a roadmap to forecast demographic and technological evolution within Latin American and Eastern Asian countries over the coming decades

Motivation

To ensure the sufficiency, capability and longevity of the sustainable transport systems within Latin American and Eastern Asian countries that are required to be developed, it is vital that the demographic changes within countries (e.g. urbanisation levels/rates; age distribution; socio-economic status) are accurately forecasted and hence planned for.

Activities

- To work with local and central governments in Latin American and Eastern Asian countries to predict the changes in demography based on census data, questionnaire data and other historical data.

Expected impacts:

- This will allow for the maximising of cooperation prospects between Europe and Latin American and Eastern Asian countries.

Target countries/regions:

- Latin America, China

Type of project: RIA

Partners: Local Authorities and PT operators in Target countries; Research Institutes in Europe and Target countries; End User Representation

This recommendation covers the following areas:

	Network and mobility management
	Clean vehicles
	Infrastructure
	Logistics
X	Public transport
X	Integrated Planning

Source of the recommendation: Viajeo Plus Consortium member -Newcastle University

Theme 6: Financing sustainable urban transport

Recommendation6.1: Financing public transport

Motivation:
Public transport systems require high levels of capital investments (for infrastructure and rolling stock/vehicles) and funding (subsidies) to cover operations and service delivery. Generally speaking, and especially in Europe, public actors assume the responsibility for the provision of infrastructure, while operators are expected to deliver predefined service levels with revenues coming from fares and other sources. In many cases an increasingly small amount of financial support or compensation for special fares (such as school children, and the elderly) is available from the public purse. In Asia and much of Latin America, public transport is expected to run without subsidies. This can be achieved as long as ridership is very high, however it can mean that quality is compromised as more people are expected to be carried at peak times, while less profitable but socially-important routes are not attractive.

In many cities in Asia and Latin America public transport has a very high modal share. It is important to maintain this high share and to ensure that the system serves also low-income regions. Opening the market to competition as done recently in Europe, innovative financing options (e.g. public private partnerships, value capturing), revenue generating policies (e.g. parking pricing), private investments or international funding may allow for the provision of sufficient capital for infrastructure and system's operation, while striking a good balance between high service level and reasonable pricing.

Proposed activities

- International knowledge exchange on innovative financing solution
- Leveraging domestic/private finance by targeted co-funding and loans
- Cooperation of funding institutions and vehicle manufactures to provide attractive financing models

Expected impacts:

- Expansion of the public transport networks
- Improvement of service quality in public transport
- Maintaining or increasing the modal share of public transport

Target countries/regions: Latin America, Asia/China

Partners: research institutes from Europe, LA and Asia/China, financing organisation e.g. development banks, public transport operators

This priority covers the following areas:

	Network and mobility management
	Clean vehicles
x	Infrastructure
	Logistics
x	Public transport
	Integrated Planning

Source of the priority: SOLUTIONS consortium partners

Priority 6.2: Financing infrastructure for non-motorized transport (NMT) modes

Motivation:
Appropriate infrastructure for pedestrians and cyclists need to be available to ensure safety and comfort. Especially vulnerable groups such as elderly, children or low income households are depending on walking and cycling. Further, a high quality system for NMT can induce a shift from motorized transport to non-motorized modes. NMT infrastructure results in considerably improved safety and comfort of pedestrians and cyclists often accompanied by generally improved quality of life in the locality (reduced noise, improved aesthetics). Different infrastructural measures are available at different costs (e.g. from improved placement of sights and lightings to cycle highways). In contrast to other modes, costs for NMT infrastructure cannot be partly recovered via pricing or fees.

Proposed activities
- Raising awareness on the role of NMT infrastructure
- Sharing very cost-effective NMT infrastructure solutions
- Dialogue on the technical and economic feasibility and funding environment to increase the introduction of NMT infrastructure

Expected impacts:
- Improvements in the quality of NMT infrastructure
- Increasing/maintaining the share of non-motorized modes

Target countries/regions: Latin America, Asia/China

Partners: research institutes from Europe, LA and Asia/China, financing organisation, cyclists associations etc.

This priority covers the following areas:

	Network and mobility management
	Clean vehicles
x	Infrastructure
	Logistics
	Public transport
	Integrated Planning

Source of the priority: SOLUTIONS consortium partners