niches

Facilitating urban transport innovation on the European level

Research and policy recommendations

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SIXTH FRAMEWORK PROGRAMME

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1 Learn from innovative experiences with NICHES

Looking for new ideas?

Are you looking for new solutions that can help you tackle unsustainable trends in urban transport?

Are you part of the research community and trying to identify research priorities in the field of urban transport innovation?

Is your work linked to EU policies in urban transport and are you interested in ideas of EU level actions to enhance innovation potential?

NICHES wants to help you in finding answers to these questions.

Aims of NICHES

NICHES (New and Innovative Concepts for Helping European Transport Sustainability) is a project supported by the Directorate General for Research of the European Commission. Its overall aim is to facilitate the coordination of research activities of academic institutions, industry, transport operators and authorities regarding key urban transport innovations that lack broad application. More specifically, NICHES promotes the most promising new urban transport concepts, initiatives and projects (NICHES Concepts, see table 1) to move them from their current "niche" position to a "mainstream" urban transport policy application.

The project thus wants to contribute to a more efficient and competitive transport system, a healthier environment and improved quality of life in urban areas.

About this document

This publication is particularly directed towards EU level decision makers and the European research community in the field of urban transport. The NICHES research recommendations want to give an input to the discussion on upcoming EU funded research activities.

A focus of this brochure is the identification of research gaps in the field of urban transport innovations in general and specifically in the four NICHES thematic areas.

Based on the identified research gaps NICHES developed, in collaboration with expert groups, key research recommendations addressing research topics, perspectives and formats.

Besides the elaboration of research recommendations, NICHES also highlights several policy recommendations to the EU level. While mainly working on local policy recommendations[1], NICHES experts also stressed the need for higher level actions. These policy recommendations are summarised in the final chapter of this brochure.

Table 1: NICHES thematic areas and Concepts

Thematic areas	New seamless mobility services	Innovative approaches in city logistics	New non-polluting and energy efficient vehicles	Innovative demand management strategies
NICHES Innovative Urban Transport Concepts	Urban Lift-sharing Services	Space Management for Urban Delivery	Policy Strategy for Clean Vehicles	Transportation Management Associations (TMA)
	Public Bicycles	Inner-city Night Delivery	Biogas in Captive Fleets	Local Taxes or Charges, Ring-fenced for Transport
	Call-a-bus Services	Alternative Solutions for Home Delivery	Joint Procurement of Clean Vehicles	City-wide Campaigns

[1] see NICHES document *Encouraging Urban Transport Innovation on the Local Level* and the 12 NICHES policy notes, available on www.niches-transport.org

2 Mega-trends

Society and the urban environment are changing with an increasing speed, which decisively influences the cross cutting issue of urban transport.

Innovation is needed as a response to key trends in urban transport. NICHES Concepts show that new solutions offer concrete tools to address upcoming challenges.

Urban transport research needs to anticipate key trends to enable timely responses and adequate policy actions on different levels. Therefore NICHES analysed key mobility trends for urban transport in general and for the four specific NICHES thematic areas in particular.

The following box provides a brief overview of some of the most relevant mega-trends influencing urban transport and mobility, which have been identified with a time perspective until 2020. It also provides a general list of expected impacts.

For a more detailed overview on this topic please see the NICHES document *Mobility Trends and Visions* (available on the NICHES website, www.niches-transport.org), which analyses a wide range of European and national sources to identify key trends for the year 2020.

Mega-trends with influence on urban transport and mobility

- Stagnation of population and ageing of society in most European countries
- Lifestyle changes towards more flexible and disperse travel patterns
- Increasing danger of social exclusion for certain population groups through lack of accessibility
- Growing security and safety concerns
- Economic growth at lower growth rates & more flexible work models and work times
- Ongoing process of European integration and globalisation
- Rising external costs of transport
- Continued suburbanisation process and growth of agglomerations
- Increasing energy prices
- Increasing environmental concerns and awareness
- Noise pollution as a growing concern in urban areas
- Increased research and applications of use of ICT
- Increased importance of e-commerce and tele-working

Impacts on transport sector

- Increased transport demand and higher volumes of freight transport
- Rising car ownership (in certain European regions steep increase, others with stagnation)
- Challenges to provide competitive and convenient public transport
- Uncertain financing of public transport and increasing involvement of private sector in transport provision
- More complex travel patterns (time and space) require tailored individual transport services
- Increase of leisure traffic
- Rising costs of transport
- Improved energy efficiency and cleaner vehicles
- Improving air quality but also increase in transport related CO_2 emissions
- Increased use of ICT to optimise transport and mobility services

Note: This is a reduced overview, which tries to summarise some key points. For more details please see the NICHES working document on “Mobility Trends and Visions” (see www.niches-transport.org).

3 Research Issues in NICHES

Approach to research issues

Which future research activities related to urban transport innovation in general, and more specifically regarding the four NICHES thematic areas are needed?

Technological developments, which are frequently in the focus of research activities, may be key drivers for enhancing innovative urban transport solutions, but insights into institutional, regulatory, financial, planning or behavioural issues are equally important to facilitate the diffusion and implementation of innovative urban transport concepts.

The overall aim of NICHES' work within the research context was to get an idea of what kind of knowledge needs to be developed, and how this could be done.

NICHES therefore focused on:

- **Research topics:**
  What is actually being investigated, examined, developed, tested, etc.?

- **Research perspectives:**
  Which disciplinary approaches are being taken (e.g. engineering, economics, social sciences)?

- **Research formats:**
  How are projects structured (e.g. budget, scale, partnership, relation between applied and theoretical research)?

Regarding these points NICHES identified **research gaps** asking the following questions:

- Which research topics are crucial for the future development of urban transport innovation in general as well as the NICHES concepts and have not been sufficiently addressed in previous and ongoing research activities?

- What are the most important research gaps identified, with regard to research perspectives and formats?

Building on this, NICHES elaborated **20 key research recommendations** focusing on research activities that are particularly required to enhance innovation in urban transport.

The work is based on results from an expert group meeting on research issues in urban transport and a survey among 34 European transport experts. The aim was to gather input from a wide range of stakeholders (e.g. practitioners, academia, policy makers). This document, however, does not claim to be exhaustive with regard to research needs for urban transport innovation. It is rather highlighting selected aspects as result of the NICHES process, which can give important insights and wants to stimulate discussion.

The analyses and recommendations in this document may feed into the ongoing definition of research topics and formats particularly on the EU level, e.g. the EC's 7th Framework Programme for Research and Technological Development (FP7).

4 Research status

4.1 General Research status

There is an abundance of EU and nationally funded research, which relates to the topic of urban transport innovation.

While it is not possible to give a comprehensive overview of all research relevant for this topic in this document, the NICHES experts particularly highlighted the importance of the EC's Framework Programmes (FPs) for Research and Development, including the CIVITAS programme on Cleaner and Better Transport in Cities. The research and demonstration work performed in these contexts has been a main reference for identifying research gaps and elaborating recommendations for future research activities in NICHES.

Within the current FP7, urban transport has an important role as well. As cross-cutting issue, urban transport is addressed in different work programmes and figures particularly prominent within the thematic priority "Sustainable Surface Transport" (activity "Ensuring sustainable Urban Mobility"). Some of the research gaps brought up by the NICHES experts have already (partially) been addressed in the specific calls of FP7.

It needs to be mentioned however, that other EU programmes (e.g. STEER, within the Intelligent Energy Europe programme) or national research activities also play an important role in urban transport innovation and were considered for the analyses as well.

Research activities on the EU level are accessible via different websites (see box on the right). A detailed overview of the state of the art of research in the field of urban mobility is provided by the EURFORUM project.

In general it can be stated that Europe has a rich research landscape in the field of urban transport. The NICHES experts considered the research to be on a generally fair level, while there are still many research gaps (see chapter 5.1, p. 9). It was highlighted by NICHES experts that the available results are frequently not well exploited and tend to be forgotten on the shelf or in web databases.

Making existing research results easier accessible and spreading good ideas among potential stakeholders for uptake was therefore a key discussion point within NICHES (see also recommendations section, p. 20).

Useful sources on research status

The following sources help individuals that want to check for past and current research activities related to urban transport innovation:

- **Transport Research Knowledge Centre**: Provides access to European, international and national transport research programmes (e.g. FP4, FP5, ECMT, etc) and projects.
  Website:
  http://ec.europa.eu/transport/extra/web/index.cfm

- **CORDIS**: Community Research & Development Information Service
  Website:
  http://cordis.europa.eu/en/home.html

  Link to 7th Framework Programme for Research and Development:
  http://cordis.europa.eu/fp7/home_en.html

- **EURFORUM**: The European Research Forum for Urban Mobility elaborated a State of the Art of Research and Development in the Field of Urban Mobility, which gives a good overview.
  Website: www.eurforum.net/html (see link results/state of the art report)

4.2 New seamless mobility services

For **Urban Lift-Sharing Services,** the value of UK research and good practice guides from the Department for Transport have particularly been highlighted, but EU projects on Mobility Management (see chapter 4.5, p. 8) are also relevant in this context.

For **Public Bicycles,** research is still weak, but there are some assessments of local schemes and some national research on specific schemes (e.g. in The Netherlands on OV-fiets; in Germany on Call a Bike). The European perspective has first been applied in NICHES. As interest for the concept is rising, there are currently various demonstration and diffusion activities going on in different countries. The current EU project SPICYCLES is also dealing with the topic.

The concept of **Call-a-Bus Services** has been well covered in EU and national research and demonstration projects on Demand Responsive Transport (e.g. EU projects: FAMS, CONNNECT, SAMPO/ SAMPLUS, VIRGIL, ARTS, SUNRISE, INTERMODE, MASCARA; UK: DESTINO; Germany: MultiBus/ PNV-Region).

Some research topics that developed over the last years have particular importance for the development and diffusion of innovative solutions in the area of New Seamless Mobility Services:

- Enhanced travel information services (door-to-door, on-trip and dynamic information);
- Electronic ticketing and multimodal smart cards.

The NICHES experts consider the status of research for the area of New Seamless Mobility Services to be on a generally **fair level**, while for specific areas many research gaps still need to be covered (see following chapter 5.2, p.13).

Selected weblinks:
Seamless mobility services

The following research activities contributed, among others, to the development and diffusion of NICHES Concepts in this area:

- Department for Transport (DfT) documents on lift-sharing.
  Note the difference in UK terminology: car sharing (UK) = lift-sharing or car pooling (continental Europe).
  www.dft.gov.uk/transportforyou/roads/planning
- Public bicycles: OV-fiets study
  www.epommweb.org/ecomm2004/workshops/anglais/Kramer.pdf
- Public bicycles: Call-a-bike research
  www.wz-berlin.de/callabike/default.html
- Spicycles
  http://spicycles.velo.info
- FAMS
  www.famsweb.com
- CONNECT (links to many projects on Demand responsive transport)
  http://srvweb01.softeco.it/connect
- DESTINO
  www.ceg.ncl.ac.uk/research/transport/projects/destino.htm
- Multibus/ PNV Region
  www.tuvpt.de/abgeschlossene-projekte/pnvregion/multibus.html

4.3 Innovative approaches in city logistics

The **BESTUFS project** was mentioned as a particularly important research activity, which helped to coordinate research activities in the field of urban freight and to better understand good practice in various cities. But other EU and national projects were also mentioned, e.g. COST 321, DIANE 6 projects (in Switzerland), several projects in FP5 and FP6. Several **CIVITAS** projects also supported the progress in urban freight initiatives.

While NICHES experts consider the status of research for the area of Innovative approaches in city logistics to be in general on a **fair level**, they also see many remaining research needs (see chapter 5.3, p. 14).

Research and demonstration activities were particularly helpful to get **night delivery** schemes started. This involved the public and private sector, for example in the Dutch **PIEK programme** on research problems and solutions associated with evening or night distribution or a business initiative in the UK.

Local initiatives were also important to foster innovation in the field of urban freight transport. In Dublin for example, a two-year programme is carrying out research to develop low noise solutions for night deliveries. The project is funded by the Dublin City Council and the relevant government departments.

The urban transport plan **PDU in France** set legal requirements for cities to address urban freight, which led to many innovative projects.

Selected weblinks: City logistics

The following research activities contributed, among others, to the development and diffusion of NICHES Concepts in this area:

- BESTUFS
  www.bestufs.net
- COST 321
  http://cordis.europa.eu/cost-transport/src/cost-321.htm
- CIVITAS
  www.civitas-initiative.org
- PIEK programme (NL)
  www.piek.org
- Dublin (two year programme)
  www.bestufs.net/workshops/2003-01-23_budapest.html
- PDU and urban freight (France)
  www.smile-europe.org

4.4 New non-polluting and energy-efficient vehicles

In the field of **Policy strategies to deploy clean vehicles**, it was mentioned that there is still the need for more research, although some important projects have been introduced; e.g. Best-Europe, CUTE, activities within CIVITAS, national projects to foster clean vehicles.

In the field of **Joint Procurement of Clean Vehicles,** the projects LEAP, COMPRO and joint procurement of Ethanol buses have particularly been mentioned.

Mainly technological research on the field of propulsion and of fuels/ energy storage is contributing to the development of clean and energy-efficient vehicles, while research on processes that facilitate behavioural adaptation to technical innovation are somehow neglected and need to become more important in the future.

Important progress is frequently made in **partnerships between research, industry and users** which is leading to practical tests and demonstrations. In Graz for example, a partnership between the Technical University, bio diesel international (BDI) and the local transport operator (Grazer Verkehrsbetriebe) enhanced progress in the field of biodiesel application. In Sweden, partnerships between the manufacturing industry, research institutes and the public sector have helped to foster the development and introduction of clean cars.

In the field of fuel production (e.g. bioethanol, biogas, syntetic gas and DME) there are good examples of cooperative research by research institutes and producers from Sweden with co-funding from the government.

NICHES experts highlighted that there is generally too much focus on hydrogen. It was a common opinion that hydrogen will not play a significant role in transport for a long time. Research on alternative fuels and propulsion technologies not focused on hydrogen need further research, also with a perspective of lifecycle analyses.

The survey among the NICHES experts showed a **heterogeneous picture regarding the assessment of the research status**. While some experts stated that there is a good overall level of research, others still see considerable deficits in certain areas (see chapter 5.4, p. 15).

Selected weblinks: Non-polluting and energy-efficient vehicles

The following research activities contributed, among others, to the development and diffusion of NICHES Concepts in this area:

- BEST-EUROPE
  www.best-europe.org
- CUTE
  www.fuel-cell-bus-club.com
- CIVITAS
  www.civitas-initiative.org
- LEAP
  www.iclei-europe.org/index.php?id=leap
- COMPRO
  http://polis.euregio.net/fileadmin/POLIS_EVENTS/March_2007_PolisAnnualConference/Compro_presentation.pdf
- BIOGASMAX
  www.biogasmax.eu
- Swedish examples
  www.miljofordon.se/english

4.5 Innovative demand management strategies

The NICHES experts considered the overall status of research activities in the area of Innovative demand management to be on a **fair to good level**. Yet, there remain many research gaps in specific areas (see chapter 5.5, p. 16) and the available knowledge is **not fully used to foster the practical implementation** of demand management measures.

A wide range of research was carried out over the years. On the **EU level,** many projects covered aspects of demand management. For the area of mobility management, particularly the MOST, MOMENTUM and OPTIMUM^2 projects have been mentioned. In the field of pricing, the CUPID, PROGRESS, EUROPRICE and CURACAO projects have been highlighted. A basis for campaigning and marketing is given by the CAMPARI, TAPESTRY and MAX projects. Practical demonstrations in CIVITAS contributed to a better knowledge on and uptake of demand management strategies.

On the **national and local level**, there has also been important research work, e.g. the Smarter Choices project (DfT) in the UK or studies around the introduction of the London congestion charging or the Stockholm road pricing scheme.

EU and national projects have contributed and will contribute to a **cumulative body of knowledge on demand management** measures that exist today.

It was particularly mentioned that **evaluation methods** for demand management measures have become better over the years and have helped to show the benefits of Transport Demand Management (TDM) measures. The development of performance indicators and evaluation criteria for assessing mobility management strategies for example helped to quantify tangible business benefits to companies that implement mobility management programs for employees**. Case studies** proved particularly valuable for new insights into demand management strategies.

Selected weblinks: Demand management strategies

The following research activities contributed, among others, to the development and diffusion of NICHES concepts in this area:

- MOST
  http://mo.st
- MOMENTUM
  http://cordis.europa.eu/transport/src/momentum.htm
- OPTIMUM^2
  www.optimum2.org
- CUPID (pricing project)
  www.transport-pricing.net/cupid.html
- TAPESTRY
  contact: ttr_nottingham@ttr-ltd.com
- Smarter Choices (DfT)
  www.dft.gov.uk/pgr/sustainable/smarterchoices
- London Congestion Charging studies
  www.tfl.gov.uk/corporate/2287.aspx
- Stockholm congestion tax
  www.stockholmsforsoket.se

Despite the large amount of research activities, there are still research topics that have not been covered sufficiently. A range of research gaps was identified by European transport experts in a working group meeting and via a written survey.

The analysis took into account the full range of activities covered by research programmes, including fundamental and applied research, exchange of research results, good practice transfer, case studies etc.

The following analysis cannot be exhaustive. It gives, however, insights obtained in the course of the NICHES project regarding gaps in research topics for urban transport in general and specifically regarding the four NICHES thematic areas.

Key research gaps have been identified for several categories and are summarised on the following pages. Some of the aspects have already been addressed or touched upon in the latest FP7 call.

5.1 Gaps in research topics: Urban transport in general

Policy and planning issues

The understanding of policy and planning processes in urban transport is still weak and needs further research. Open questions concern such topics as multi-level governance, urban transport planning or improved partnership structures. Long-term perspectives of energy security in case of peaking energy prices have also not sufficiently been addressed yet.

NICHES experts particularly highlighted the need for improved decision support tools that help stakeholders in urban transport to identify the most efficient measures to work towards a more sustainable transport system, also within integrated packages (e.g. what is the most efficient combination of measures to tackle air pollution in the city centres and to avoid social exclusion?). This would require complex tools and models, which should nevertheless be easily applicable.

Policy & planning issues	
Decision support tools	Need for easy-to-use decision support tools to assess the costs, benefits and efficiency of a wide range of policy options to address urban transport problems. Understanding the social and environmental impact of different transport policy options (also unintentional impacts – positive or negative). A decision support tool also needs to consider the application of integrated strategies and the use of innovative solutions.
Sustainable Urban Transport Planning (SUTP)	Better understanding of suitable planning processes for different context conditions needed (e.g. via analyses of good practice), which lead to integrated transport strategies. Integration of transport innovation in comprehensive mobility strategies.
Multi-level governance	Need to research different approaches to governance, e.g. in the field of land use; comparison of decision making on local vs. centralised level.
Urban transport planning in the regional context	Better understanding of the reciprocal effects of actions on the local level (e.g. core city) on the regional level (e.g. surrounding communities) and vice versa.
Partnership structures	Understanding of public-to-public, private-to-private, and public-to-private partnerships needs to be improved.
Air quality driven actions	How to set an effective and specific (political) framework in which the industry is required to reduce emissions, e.g. by defining emission targets that the industry needs to comply with.
Prevention against peaking energy costs	Research question: How to prevent vulnerability of our society and economy in case of peaks in energy prices?

Land use and urban design

Land use and urban design are closely linked to urban transport and set a crucial framework for long-term developments. The topic still needs a better understanding, especially via the analysis and development of enhanced concepts to integrate land-use and transport planning in a more efficient manner.

Land use and urban design	
Integration land-use and transport	Better concepts to address the integration of land-use and transport planning require better understanding of the topic and enhanced exchange of existing knowledge and research results.
Increasing density and strengthening city centres	Analysis of better concepts to increase density in urban areas, strengthen city centres and achieve a real impact on travel behaviour.
Dealing with urban sprawl	Analysing/ developing concepts to address modal split in growing and sprawling areas.
Long term impacts	Understanding of long-term impacts of land use on transport in different European regions.

Economic issues

Financing urban transport is becoming an increasingly challenging and complex task. There are still many research gaps in this important field, ranging from better cost-benefit analyses, new concepts to finance and fund transport services or questions on how to give effective incentives for clean vehicles. Taxes in transport pricing or the development of clear concepts and methods for the internalisation of rising external costs of transport are also fields that have not been well exploited so far.

Economic issues	
Improved cost-benefit analyses	Better methods for cost-benefit analyses of conventional and innovative transport measures are needed. This is particularly important for innovative solutions, which need to prove their efficiency and added value.
Financing urban transport	How to finance urban transport without damaging the competitive market? What could be new concepts to finance urban transport?
Public transport funding and financing	How could future public transport services be funded and financed efficiently (new models)?
Incentives for clean vehicles	How to best provide economic incentives for clean vehicles and fuels?
Taxes in transport pricing	Total tax issues. Evaluation of the concept of land use taxes for different context conditions in Europe.
Cost internalisation	Concepts and methods for internalising the external costs of transport. It is crucial to be able to link the impacts to the actual drivers.
PPPs	Better understanding of public-private partnerships in urban transport and of the optimal distribution of services between the market and public service needed.

Social issues

Urban transport is strongly related to many social issues, which are frequently neglected in research programmes. There seems to be a particularly urgent need to do research on the impact of demographic change on urban transport in Europe, but also on other topics such as collecting better data on travel behaviour, the needs and wants of users, concepts to make city centres more attractive as well as the social long-term effects of mobility measures.

Social issues	
Demographic change	Better understanding of the influence of an ageing society on urban transport and mobility required. A key topic for the future of many European cities.
Better data on travel behaviour	Lack of data on travel behaviour, particularly for specific target groups (e.g. elderly people, inhabitants of peri-urban areas). Need for making existing data more easily accessible (e.g. EUROSTAT).
Better understanding of acceptance	Better understanding of the mechanisms of acceptance of new services and concepts by stakeholders: e.g. partnerships, stakeholder integration and acceptance.
"Real needs" for transport and mobility	Better understanding of the "wants and needs" of users as well as the perception of user needs by the operators. Assessment of the mobility culture.
Innovative solutions for better quality of life in city centres	Beyond mobility, but with influence on it: Maintaining the vitality of the city centre or poly-centres, the socialising human, car-free living, collective vs. individualised lifestyles.
Social long term effects of mobility measures	Better understanding of such effects as social "gentrification" following infrastructure improvements leading to new mobility and social exclusion issues.

Public transport

Public transport (PT) is constantly developing. Particularly hot research topics which need more attention are public transport systems on separated lanes or tracks (e.g. Bus Rapid Transit - BRT), the potential of automated vehicles and enhanced electronic ticketing. There also seems to be the need to develop PT systems beyond mass transit and to improve the understanding of the involvement of the private sector in PT provision.

Public transport	
Public transport on separated lanes/tracks	More research on concepts to provide public transport on separated tracks/ lanes (e.g. BRT, trams).
Private involvement	Better understanding successful models for private involvement in public transport provision.
Automated vehicles	Evaluating potential of automated vehicles for provision of fast and convenient public transport (speeding up or as feeders).
Electronic ticketing	"Be in – be out" registration, best pricing, multimodal mobility cards which enable access to a range of transport services.
Supply side	Public transport supply beyond "high volume" public transport.

Gaps in research topics (continued)

Walking and cycling

Despite their importance and potential for large parts of the population, non-motorised transport modes have been neglected considerably in the research arena. In general, they need much more attention. Particular research topics are for example the provision of suitable urban environments for walking and cycling and a closer look at innovation in the area.

Walking and cycling	
Neglected in research	Need for stronger consideration in research programmes as serious transport modes with high potential to contribute to a more sustainable urban transport system.
Interlinkage with urban design	Building the city for walking and cycling (through proper planning, investment policies etc.)
Innovations	Examination of innovation as new policies for walking and cycling (e.g. “pedibus” in France or “walking bus” in the UK, public bicycles etc.)

Other issues

A range of other research gaps has been identified within NICHES. They refer to the infrastructure of urban transport, technical developments of traffic management systems, legal issues of guided vehicles and developments such as corporate social responsibility.

Other issues	
Traffic management systems	Further technological development of traffic management systems.
Infrastructure	How to better exploit the existing infrastructure?
Architectural qualities	Quality of architecture of mobility infrastructure.
Institutional and legal issues relating to guided vehicles	Are they to be considered road or rail vehicles?
Corporate social responsibility	Which role can an enhanced corporate social responsibility play in the transport sector (vs. compulsory measures), for example sponsoring of mobility services.

5.2 Specific research topics: New seamless mobility services

For the area of seamless mobility services, research gaps exist in particular regarding behavioural aspects and the transferability to specific regions, but also in the field of technological and organisational developments to optimise service provision. Financial issues need to be studied further to make the concepts examined in NICHES sustainable in the long run and to better show their benefits. The legal and regulatory framework can be decisive for the uptake and implementation, but has not been analysed in depth so far. There also seems to exist potential to develop completely new kinds of tailored seamless mobility services that enhance mobility options in urban areas.

Research topics	
Better understanding of mobility culture	Mobility culture is a key issue for the uptake of urban transport innovations in the area of seamless mobility services but it is not well understood. An example regarding cycling: Is the higher use of the bicycle in some countries mainly linked to cultural aspects or to the fact that proper infrastructure is provided? What comes first? How to promote life-long cycling?
Transferability analyses	There is, for example, interest in CEE countries in DRT, but what are suitable ways of transferring such solutions?
Intermodal passenger information	Information that integrates different modes is a priority aspect for developing seamless travel chains. Existing passenger information systems cannot completely satisfy the needs of the intermodal traveller. Intermodal passenger information should also offer pre- and on-trip information for mobile technologies. Information systems should include innovative concepts such as Urban Lift-sharing Services, Public Bicycles or Call-a-bus Services.
Multimodal smart cards for integrated ticketing	Further development of electronic ticketing is needed, which integrates all modes and offers best pricing for customers.
ITS solutions for scheduling and array of DRT services	Many software solutions are available, but none are adequate to cater for a greater integration with service provision.
Impact of DRT solutions on land use	The relation between demand-responsive transport, land use and urban development is not completely understood yet. Do Call-a-bus Services promote urban sprawl?
Possibility to link services for passenger transport with logistics	The integration of passenger and freight transport is needed to optimise the whole system: e.g. DRT scheme linked with parcel delivery in rural areas.
Cross-sector analyses of cost and benefits	There is a need for cross-sector analyses of costs and benefits of integrated planning with particular reference to flexible services (e.g. DRT, urban lift-sharing) and their social inclusion benefits.
Financing models	Research is required on sustainable models for financing new flexible approaches as Public Bicycles and Urban Lift-sharing Services in the long run.
Legal and regulatory framework	It is necessary to look into options for a framework that enables easy implementation of concepts and encourages private initiative. Particularly relevant for DRT.
New kind of mobility services	Research is required to develop new services and concepts could have potential to address special market needs, e.g. public two-wheelers (as e-scooters) could be part of an integrated transport system and be accessible through integrated ticketing, which might especially be interesting for Southern Europe.

5.3 Specific research topics: Innovative approaches in city logistics

In the field of city logistics, the NICHES experts highlighted a wide range of research gaps. This concerns fundamentals, such as the need for better urban freight data and a better understanding of impacts and user acceptance, but also research needs regarding specific concepts. For night delivery, technical and regulatory issues should be addressed by further research activities. The sector of home delivery offers potential to be enhanced by further innovation in trip planning software and customer information. Other research gaps can be found in the area of cooperation forms, the impact of clean air plans on urban freight traffic and waste logistics.

Research topics	
Impact of urban freight solutions	Understanding the relation between urban freight and socio-economic development. Social impact of inner-city night delivery (e.g. noise, working hours, costs, benefits).
User acceptance	User acceptance of innovative delivery solutions: e.g. locker boxes - user acceptance and traffic impacts of pick-up points.
Implications of changing shopping behaviour	City centre retailers are disappearing while large shopping malls appear at city edges and more and more e-commerce home deliveries take place.
Urban freight data	How to capture urban freight data in an effective way? Data is essential but at present too limited.
Improving urban freight modelling	Improving urban freight modelling. There is quite a number of good innovative concepts, but they need to be enhanced and supported in order to explore the value at the European level.
Permitting and control of quiet vehicles	Need for a labelling systems for quiet trucks (night delivery).
Innovation in trip planning and customer information	In home delivery, using trip planning software can help to optimise last mile delivery rounds taking into account any delivery time window agreed with customers. This still needs further research and development activities. IT and communication systems could be used to provide the customers with more information about the status of their delivery, and thereby reduce the risk of failed deliveries that occur when the customers are not at home to receive their goods. This topic also needs further understanding.
New cooperation forms	New organisational structures and cooperation of operators in city logistics (cooperation between express service and shippers, funding, stakeholder analysis).
Effect of clean air plans on accessibility	Clean air plans and accessibility of city centres for delivery traffic (e.g. technical preconditions, organisational measures, economic impacts).
Innovative waste logistics and transport strategies	Development of innovative waste logistics and transport strategies and measures which make the waste collection more efficient and reduce the environmental burden. Such approaches should consider new vehicle and collection technologies, intermodal transport, ITS, pick up systems with specific containers, night collection etc.
Effects of vehicle size	Explaining the role and advantages/ disadvantages of using (allowing) smaller or larger vehicles to enter the city centre and to study the interfaces to long-distance transport.
Improving quiet night delivery	Mechanical, architectural and management/ organisational solutions to attenuate noise. Better (improved) technology to minimise night time disturbance from goods delivery, e.g. develop acoustic materials for trucks, ancillaries and logistic sites.

5.4 Specific research topics: New non-polluting and energy efficient vehicles

Alternative fuels and propulsion technologies need further research, also with a perspective of lifecycle analyses. Many research gaps exist regarding societal context conditions for uptake and market studies. If there is a demand for alternative vehicles, the industry will provide them. However, the pathway to increasing consumer demand for alternative vehicles is very poorly understood and needs far more attention.

Research topics	
Societal energy needs	Research is needed on the best use of alternative fuels in relation to total societal energy needs (transport/ heating/ electricity), e.g. the same fuel can be taxed differently depending on the purpose that it is used for.
User acceptance and framework conditions	Better understanding of user acceptance, behaviour and framework conditions for uptake of clean vehicles needed. Evaluate what makes consumers choose alternatively fuelled vehicles. How does the cost level of transport influence transport organisation and consumer behaviour? Evaluation of successful examples, e.g. Sweden.
Market trends and opportunities	Analyses of market trends and opportunities for clean and energy-efficient vehicles and of manufacturers' point of view. Develop transition methods from oil to alternative fuels by assessing transitional pathways.
Incentives to promote clean vehicles and fuels	Studies on the best ways to give incentives that promote the market introduction and use of clean vehicles and fuels. Common framework for assessment of incentive schemes needed.
Cost-benefit analyses	Better understanding costs and benefits of available non-polluting and energy-efficient vehicles.
Joint procurement	Studies on which factors pushed or pulled stakeholders to actually work with joint procurement would be helpful to enhance their use. Procurement schemes that include the whole life cycle when evaluating tenders are needed.
More attention on non-motorised vehicles	"The cleanest vehicle is the bicycle", but it is not sufficiently taken serious in policy and research programs.
Bioethanol from cellulose	Development of production of bioethanol from cellulose (wood and straw). "Second generation" biofuels.
Biogas production	Enhancing production of biogas from various sources of organic waste.
Distribution chain of gaseous fuels	Develop the distribution chain for gaseous fuels further.
Renewable fuels for diesel engines	Biofuels appropriate for use in diesel engines, also in heavy vehicles' engines.
Bio synfuels	The development of coal- and natural gas-based synthetic fuels is in full speed. There is a strong need for the development of efficient gasification technologies (e.g. gasification of biomass).
Lifecycle analyses	Lifecycle analyses of renewable clean fuels.
Hybrid technology	Further research on and development of hybrid vehicles, regardless of fuel and car type, also heavy vehicles. Efficient plug-in hybrids.
Electric vehicles	Improve electrical vehicles, also two-wheelers.

5.5 Specific research topics: Innovative demand management strategies

For demand management strategies, it is particularly relevant to better understand mobility behaviour and how to influence it, e.g. via stick and carrot measures. This is a relatively complex research topic, which needs further attention. Economic and financial aspects of demand management strategies are in many cases also still poorly covered in research activities, e.g. understanding of the market, cost-efficiency and evaluation, funding mechanisms. Other key questions that need to be answered are topics of partnership building, public participation, transferability of successful concepts to New Member States and tailored solutions for smaller cities.

Research topics	
Mobility culture and socio-cultural research	Better understanding of existing “mobility cultures” and how to influence them. Best practice transfer needed. Strong need for socio-cultural research on urban transport aspects.
Effect of clean vehicles on driving	Are users of clean vehicles driving more because they feel that they pollute less?
Impact of introducing disincentives	Better understanding the impact of disincentives for private car use (e.g. parking policies, charging schemes, regulations).
Image and marketing	How to improve the image of sustainable transport modes? Impacts of campaigns. Marketing social responsibility.
Quality of life	Study on impacts of travel arrangements on quality of life (e.g. commuting times).
Understanding of market	Perception and attitudinal market research with the public and with corporate organisations.
Cost-efficiency and evaluation	Comparative analyses of infrastructure measures to show cost-benefit advantage of demand management measures. Determination of external effects. Need for prospective assessment tool to better assess transport demand management (TDM) measures before implementation.
Funding mechanisms	Need for models of stable self-sustaining independent funding mechanisms that enable stakeholders to run demand management measures with a long term perspective (e.g. financing of Transport Management Associations).
Governance issues	On which governance level should TDM measures be implemented?
Public participation	Need for studies to assess how the public can best be involved in the planning of measures.
Analysis of partnerships	Lack of understanding of partnerships in demand management. Who, what, and which impacts can you generate? The topic of public private partnerships has also not been studied well for demand management although many opportunities for such models exist.
Suitable measures for smaller cities	Evaluate suitable TDM options for smaller cities, e.g. alternatives to congestion charging with similar impacts.
Transfer to New Member States	How can good practice from the old member states be transferred to the New Member States?
Analysing use of motorised two-wheelers in urban areas	Better understanding the use of motorised two-wheelers, also as they are used to avoid access restrictions for car traffic. Particularly relevant for Southern European countries.
Road Space Reallocation	Impact on congestion and liveability in the city. Rethinking the prioritisation of the network for the different users with beneficial impacts.

6 Gaps in research perspectives

Not only research topics, but also the question of which disciplinary approaches (e.g. engineering, economics, social sciences) are taken in research projects decisively influences the outcomes. Therefore, NICHES experts were asked where they see current gaps in research perspectives within the field of urban transport.

The following issues were brought up:

Lack of truly interdisciplinary approaches

It is needed to move further along from multidisciplinary to interdisciplinary research approaches, based on true cooperation of different disciplines. This needs to include: Engineering (with its different fields); Social sciences, Law and Political sciences; Economics; Marketing and media; Environmental sciences; Psychology; Health sciences; Transport history; Urban planning; Geography; Archaeology and others. The best mix of disciplines to involve in a research activity of course depends on the research topic and approach. Partnership mapping while drafting research projects could be a tool to determine which potential research perspectives need to be included.

Intersectoral cooperation needs to be strengthened

Many stakeholders that would be relevant for a research topic are not well represented in current research activities. There is a need to strengthen intersectoral cooperation. Research should include partnerships between a wide range of stakeholders such as for example manufacturers, consumer associations, universities and local authorities.

Social science and behavioural psychology

These disciplines need to be involved more to enable researchers to better understand individual driving forces of consumers and behavioural adaptations and mobility cultures. Behavioural aspects of transport and mobility are still underestimated in a rather technology-oriented research arena. Also Media-related sciences and economics may also contribute to a better understanding of behavioural aspects.

Economic perspective

Economic and market issues are key factors for the uptake of urban transport innovation. The consideration of economic perspectives, e.g. a better analysis of the market for clean vehicles, is still weak and prevents a better understanding of uptake mechanisms. Cost-benefit analyses and assessments of the added value of innovative solutions also require a stronger economic perspective.

Law

The development of innovative approaches in urban transport and the actual uptake rely in many cases on suitable legal and regulatory framework conditions. Law, however, is not well represented in research projects, although it could contribute much to analysing current framework conditions and making proposals how to improve them. Examples of where more research from a legal perspective is needed are the topics of joint procurement and incentives (e.g. free use of clean vehicles in congestion charging zones) or the status of semi-public transport services with regard to public funding options. Permitting and control in urban freight also require jurisdictional support.

Political and planning science

A stronger involvement of urban/ transport planning and political science is needed to understand the full spectrum of factors that are relevant for the development and uptake of urban transport innovation. Policy and planning issues are key factors for the successful implementation of technically and organisationally already mature solutions.

Health science

Health science is underrepresented in research projects on urban transport, although it could play the role of an important motivator to foster transport alternatives.

Lack of Transport Demand Management experts

In the TDM sector, there is a lack of human capacities and activities are often dominated by engineers. The curriculum of TDM as a specific study and job profile needs to be further developed and deployed. The involvement of more professionals from the social sciences is needed.

7 Gaps in research formats

The way research projects are structured (e.g. budget, scale, partnership, relation between applied and theoretical research), determines to a large extent which outcomes are achieved.

NICHES experts saw several general gaps regarding the structure of research projects, which need to be addressed:

Combination of fundamental and applied research

Applied research in combination with a theoretical approach has potential synergies that have not yet been fully exploited. For engine development, for example, the fundamental research of manufacturers is important, but the development should include urban demonstrations and tests to a higher degree. Research and large-scale demonstration are too often isolated from each other.

Integrated projects and partnerships

NICHES experts saw a lack of integrated projects that demonstrate the implementation of solutions with participation of a wide range of stakeholders such as private companies, the public sector, authorising bodies, user representatives, city networks and research facilities. Such demonstrations would also need to include models such as PPPs. It seems that private parties are particularly underrepresented, even in fields where they play a key role (e.g. in the field of urban freight). Integrated projects also lack to consider fields that are closely related to urban transport problems, e.g. land use issues.

Practical experiments

There is a general lack of applied science and demonstration of new solutions. More “practical experiments” could contribute to better exploiting valuable research results. This would require more cooperation between researchers and practitioners. Particular fields to address could be:

- Large scale pilot projects on the level of a city or region that demonstrates the value of demand management tools for a wider area and generate data for models and predictive tools.
- Practical application of research findings to long-range planning and strategic transportation planning processes.
- Demonstration projects in the field of urban freight.
- Demonstration of low- (or reasonable-) cost solutions with high performance that can result in a breakthrough and a general acceptance of the low-emission vehicle concept by car manufacturers and customers.

Take-up mechanisms

Generally, take-up mechanisms should feature more prominently, the legal and social barriers to take up research results are frequently not considered sufficiently.

Exchange of experiences

In many areas, there is a lot of highly valuable research going on. However, the exchange of such experiences between research projects, institutions and concerned stakeholders is frequently still lacking and should be further stimulated from the EU side. Study tours for stakeholders that play a key role in uptake could be an effective tool of promoting exchange of experiences, which has not been well used so far and lacks funding.

Training

There is only little training activity in the field of urban transport funded by the EU, which is an obstacle to efficiently transfer urban transport solutions and practical research results. Good examples (e.g. TRUMP – Training Programme for Urban Transport Professionals) proved that training activities meet a real demand. Building up adequate skills must be seen as a key factor to enabling uptake of good solutions all over Europe.

Accessibility of research results

Many of the available research results are not easily accessible, due to language barriers, the format of presentation or the lack of practical guidelines on how to use the results. This leads to a waste of highly valuable knowledge, which has the potential for practical application.

Budget and payment procedures

Low co-funding rates in some EU programmes and delays in payments are posing severe difficulties for larger parts of the scientific community and SMEs, which do not have the capacities and resources to deal with these conditions.

Participation chances of SMEs

Specific programmes for small-sized firms are still underdeveloped, they would require small partnerships, less formal requirements and reduced bureaucracy.

Administrative procedures

In general, experts involved in EU research projects see the need for more practical administrative procedures and a reduction of bureaucracy.

Transition between Framework Programmes

In the past, transitions between different Framework Programmes (FPs) often caused a hiatus between programmes, an interruption to teams, and discontinuity of measures especially for exploitation. FP7 slightly improved this situation, while it seems important to work further into a smooth transition for future FPs.

8 Research recommendations

This chapter highlights 20 key research recommendations which have been formulated within NICHES. They have been developed at a working group meeting with NICHES experts or are based on the written input from the research survey.

The following recommendations try to summarise priority issues for future research on urban transport innovation. The recommendations address research topics, perspectives and formats.

As a research fundamental it was stressed by the NICHES experts that before doing new research, it is crucial to look in the first place at existing results. The rich pool of research results on the topic of urban transport is not well exploited and many issues that were already researched are examined over and over again.

The following research recommendations are targeted at EU level decision makers and the European research community. They should not be understood as exhaustive list, but rather as input to the discussion on future research needs.

Overview of NICHES research recommendations

Fundamentals

1 Before doing new research, take into account the existing results

Topics	Perspectives	Formats
2 Improve assessment methodologies and create practical decision support tools	**11 Foster interdisciplinary approaches**	**14 Set urban transport research in its regional context**
3 Strengthen research on interlinkages with urban development/ land use planning	**12 Strengthen intersectoral perspectives**	**15 Better target local authorities as end users of research results**
4 Assess and analyse adverse and unforeseen effects	**13 Balance research perspectives and include all relevant disciplines**	**16 Run more “practical experiments”**
5 Get insight in change management. What makes it happen?		**17 Make research and knowledge better accessible via training**
6 Improve the understanding of the impact of demographic change on urban transport		**18 Foster exchange of experience**
7 Give non-motorised transport an appropriate status in research activities		**19 Encourage integration and partnerships**
8 Strengthen research on urban freight innovation		**20 Simplify administrative and payment procedures in EU projects**
9 Better consider the full spectrum of alternative fuels and market uptake		
10 Profile the mobility culture and enhance understanding of mobility behaviour		

Fundamentals

Recommendation 1: Before doing new research, take into account the existing results

The European research landscape provides a rich pool of research results on urban transport issues. It is, however, a severe problem, that many of the research results are not finding practical use. This is due to different reasons, for example the real or perceived lack of easy access to research results, language barriers, insufficient dissemination activities and report formats that are not easily readable.

Therefore it is strongly recommended to enhance activities to foster the use of existing research results. This can help to avoid repetitive work and to use existing knowledge as a valuable basis to build on.

Concrete measures to tackle this issue could be:

- The improvement of the access to national and local research (e.g. European Urban Knowledge Network - EUKN approach);
- A more efficient dissemination of project results (e.g. PORTAL, ELTIS, OSMOSE approach), also feeding into important national dissemination structures;
- More translation of well readable dissemination material into main European languages and feeding them into national information structures.

Research Topics

Recommendation 2: Improve assessment methodologies and create practical decision support tools

Despite all the progress that has been made concerning knowledge about the impact of measures to tackle urban transport problems, adequate decision support tools are still lacking.

What is, for example, the best integrated package to address air quality issues, greenhouse gas emissions, social exclusion issues and other topics? Decision makers, technical staff in local authorities and other stakeholders involved would benefit considerably from easy-to-use decision support tools. Modelling, evaluation, comparative cost-benefit analyses need to be considered in this context. Methods and tools should be based on common standards and formats for data gathering to enable cross-project and cross-border comparison. They should enable those involved to understand the social, economic and environmental impact of transport policy (also unintentional impacts – positive or negative) and need to consider the application of integrated strategies, including the use of innovative solutions.

Recommendation 3: Strengthen research on interlinkages between urban transport measures and urban development/ land use planning

The interrelation between transport measures and urban structure should be considered stronger in EU research on urban transport. There are manifold issues to be addressed, e.g.:

- The long-term impact of land-use patterns on transport in different European regions;
- Concepts to increase urban density and strengthen urban qualities in core cities to keep people in cities;
- Efficient ways to tackle sprawl and enable sustainable transport patterns;
- Potential impacts of providing (innovative) transport services that might contribute to urban sprawl (e.g. demand-responsive transport, park and ride).

Research recommendations (continued)

Recommendation 4:
Asses and analyse adverse and unforeseen effects

Measures in urban transport that seem promising are often implemented without assessing and analysing possible adverse effects. Examples are the increase of benzene emitting motorised two-wheelers in areas with access restrictions for cars, crowding out effects, or extra car-based trips through park and ride schemes. Such effects need to be studied in more depth as they may play an important role in the final outcome.

Recommendation 5:
Get insight in change management. What makes it happen?

The understanding of change management is still lacking. Research should address this topic to a higher degree and try to understand the key drivers (and barriers) for change. Issues that need to be better understood are for example: key stakeholders and their roles in implementation, transferability potential of solutions, leadership structures (public or private), capacity in city services, user acceptance or national vs. local or regional politics.

Recommendation 6:
Improve the understanding of the impact of demographic change on urban transport

Most European countries face a significant demographic change. Low birth rates and increasing life expectancy will lead to a growing number of elderly people. This will create new mobility patterns and demand for adequate and tailor-made mobility or delivery services. This is a key topic for the future of many European cities, which is still poorly understood and requires more research activities.

Recommendation 7:
Give non-motorised transport an appropriate status in research activities

Walking and cycling play a significant role in urban transport and have unexploited potential to contribute to more sustainable transport patterns.

This is not reflected in the current level of research activities. They should be considered as “serious transport modes” that are on an equal level with motorised transport modes. Cycling and walking are closely linked to issues such as urban design and land use and need to be looked at from an integrated perspective.

Recommendation 8:
Strengthen research on urban freight innovation

The urban freight sector is developing very dynamically. The “last mile” segment has steadily growing freight volumes. Deliveries and return consignments are already a remarkable source of traffic in metropolitan areas. This requires more dedicated research in this area to better understand patterns of urban freight traffic (e.g. better data, improved modelling) as well as research on technical solutions to facilitate innovation (e.g. quiet night delivery, IT and communication systems for trip planning and customer information).

Recommendation 9:
Better consider the full spectrum of alternative fuels and market uptake

Some NICHES experts stated that research is generally too much focussing on hydrogen. There was, however, a common opinion that hydrogen will not play a significant role in transport for a long time, if ever. Hence there is a need to also develop other alternatives. These alternatives may need to serve for long time, as the hydrogen society may take long to realise (“We will make progress slower than we want”). Experts highlighted that not only the hydrogen technique has a long way to go; it would even take more time to make hydrogen competitive in economic terms. Ethanol, biogas and biomass-to-liquid/gas (BTL/G) are alternatives that need further research and development. These fuels exist today, but there is an unexplored potential to increase energy efficiency and economic viability in the production and to decrease emissions from the vehicles.

Consumers’ choice and buying power is of main interest for the industry. If there is a demand for alternative vehicles, the industry will provide them. However, the pathway to increasing consumer demand for alternative vehicles is very poorly understood and needs far more attention.

Recommendation 10:
Profile the mobility culture and enhance understanding of mobility behaviour

Despite their crucial importance, behavioural aspects of transport and mobility are underestimated in a rather technology-oriented research arena.

A better profiling of the mobility culture at different levels within and between countries and cultural backgrounds (from EU regions down to the individual) is needed as basis for decision-making in urban transport. Mobility behaviour is a complex research task, which needs more attention. This should also include the reaction of stakeholders to new transport measures.

Further research topics:
Please see the Chapter 5 “Gaps in research topics”, p. 9 ff., for a number of further research topics that should be considered in future research activities.

Research Perspectives

Recommendation 11:
Foster interdisciplinary approaches

Truly interdisciplinary approaches are still lacking in research on urban transport issues. To effectively tackle complex problems, a better collaboration of a wide range of different disciplines and cross-sectoral thinking are needed. Traditional boundaries between disciplines are still frequently very pronounced and a barrier to truly interdisciplinary approaches. Future research projects should foster interdisciplinary approaches and identify suitable combinations of different disciplines via partnership mapping. Social and governance issues also need to be addressed properly to efficiently tackle urban transport problems. Their importance as key pillars in the sustainability approach is not yet recognised in research agendas and needs to be strengthened within interdisciplinary approaches.

Recommendation 12:
Strengthen intersectoral perspectives

Future research activities should foster partnerships between a wide range of stakeholders; e.g. the user perspective needs to be taken into account to the same degree as the views of industry, public authorities or researchers. This requires the early identification of relevant stakeholders and their potential role in the research area. Bringing together diverse stakeholders can amplify the view on the research topic and contribute to better outcomes.

Recommendation 13:
Balance research perspectives and include all relevant disciplines

Many disciplines that have a large potential to contribute to research activities in the field of urban transport are not well represented. NICHES experts particularly highlighted the need for a stronger involvement of social and behavioural psychology, economy, law, political and planning science and health science (see Chapter 6, p.17). For future research programs, a more balanced representation of different disciplines that are relevant for certain research contexts should be aimed at.

Research formats

Recommendation 14: Set urban transport research in its regional context

For many research activities (e.g. demonstrations) it is essential to define the spatial perimeter. The ideal scale for the research approach is, in many cases, the regional level, which is currently only considered insufficiently. A pure focus on the urban core city does not take into account the manifold interrelations with the surrounding regions.

In projects that involve stakeholders on the local and regional level (e.g. public authorities, transport operators), institutional interaction is needed and coherent objectives for the research on a regional scale are needed.

Recommendation 15: Better target local authorities as end users of research results

Local authorities are key stakeholders in tackling urban transport problems. This should be better taken into account by developing suitable and more practical decision support tools and information services for local authorities as output of research projects (e.g. a DRT business plan model, clean vehicle databases, or practical guidance for implementation of measures).

Recommendation 16: Run more "practical experiments"

Applied science and practical demonstrations of urban transport innovation should be strengthened. "Practical experiments" could also contribute to a better uptake and testing of theoretical research results. This would require more cooperation between researchers and practitioners. Particular fields to address could be large scale pilot projects on the level of a city or region that demonstrate the value of demand management tools, the practical application of research findings to long-range planning processes or further demonstration in the area of city logistics and clean vehicles.

Recommendation 17: Make research and knowledge better accessible via training

The transfer of knowledge in many fields which are relevant for urban transport is still poorly developed. Many valuable results from European research projects are not communicated in an appropriate way to stakeholders who are in charge of practical application. Training programmes funded on the European level could be an effective tool to spread knowledge and encourage practical uptake.

Recommendation 18: Foster exchange of experience

The exchange of experiences between different research projects, institutions and concerned stakeholders is frequently still weak and should be stimulated further from the EU side. Certain forms of exchanging experiences that have not been well used so far (e.g. study tours) could also be effective tools to promote an exchange of practical experiences.

Exchange should also be encouraged by making good practice experiences from across Europe easily accessible on the web in a common database, which is properly promoted among cities. Current good practice sources on the web are mostly limited in scope and not always up-to-date. Existing solutions can however be the basis for a more complete approach.

The exchange on urban transport research between the old and the New Member States (NMS) should be more bidirectional, to foster learning and mutual understanding on both sides. For research on urban transport innovation, the specific situation of NMS needs to be taken into account; e.g. which NICHES Concepts can be best implemented in the NMS, and where[2].

[2] See chapter on NICHES' potential in Central and Eastern European Countries in the NICHES report *Mobility Trends and Visions*, available on www.niches-transport.org.

Recommendation 19:
Encourage integration and partnerships

Research formats should better foster integration between different policy fields and promote diverse partnerships. NICHES experts see, for example, a lack of integrated projects that demonstrate the implementation of solutions with participation of a wide range of stakeholders (e.g. different policy fields from the public sector, private companies, user representatives, city networks, research facilities and the academic sector). Demonstrations should also include such models as public-private-partnerships. The integration between fundamental and applied research needs to be strengthened to fully exploit potential synergies.

Recommendation 20:
Simplify administrative and payment procedures in EU projects

The administrative procedures in EU projects should be simplified further and the bureaucratic burden should be minimised. This includes budget and payment procedures, which are posing difficulties especially to those parts of the research community and SMEs that do not have the capacities and resources to deal with these conditions. Specific programmes for small-sized companies are still underdeveloped. The transition between different Framework Programmes of the EC should be smoother in the future to avoid discontinuities for research teams and exploitation measures.

9 EU policy recommendations

This chapter contains 10 policy recommendations addressed to EU policy makers that have been highlighted by different urban transport experts during the NICHES working group meetings. Particularly the 4th working group meeting dealt with the question which activities are needed to enhance urban transport innovation.

The development of EU level policy recommendations has not been the main focus of the NICHES project, but it seems valuable to bring the points discussed during the project to attention. While most of the recommendations focused on the local and regional level[3], the experts also stressed the need for action on higher levels.

These recommendations are of course not exhaustive and only refer to selected points. Nevertheless they highlight the need for EU level actions to further support the development and implementation of urban transport innovation.

They should be understood as input to discussions on the EU level on the future of transport policy. The current discussions within the context of the upcoming Green Paper on Urban Transport for example offer a chance to confirm or set new priorities for EU level actions.

The following table gives an overview of the NICHES policy recommendations to the EU level, which are briefly explained on the next pages.

Overview of EU policy recommendations

1	**Provide clear EU-wide definitions of sustainable urban transport and clean vehicles**
2	**Strengthen the status of soft measures in EU policies**
3	**Encourage development of SUTPs**
4	**Foster EU-wide promotion of and training on sustainable urban transport**
5	**Continue support for EU-wide networking activities**
6	**Provide practical guidance on implementation**
7	**Support standardisation activities for clean vehicles and road pricing**
8	**Provide adequate framework for urban road pricing**
9	**Review legislation and regulations for urban transport innovations**
10	**Strengthen green procurement activities of clean vehicles**

[3] See NICHES document *Encouraging Urban Transport Innovation on the Local Level* and the 12 NICHES policy notes, available on www.niches-transport.org

Recommendation 1:
Provide clear EU-wide definitions of sustainable urban transport and clean vehicles

To make "sustainable mobility" a subject of public policy requires at least a commonly accepted understanding of what this notion actually stands for. While there are many abstract definitions readily available, these continue to have little relevance for local planning practice. Most definitions do not offer any consideration of their institutional and organisational implications. Moreover, if actors are to identify with the actions that could be derived from such definitions, these also need to become "localised", i.e. should be agreed locally by the actors concerned. To facilitate this process, the EU could take the lead, developing and promoting a definition of sustainable mobility that makes explicit what it means to practically work on sustainable mobility - across modes and policy domains - in a given local urban context.

In the field of clean vehicles, commonly agreed EU wide definitions are also still lacking. Currently there is a patchwork of different definitions for what can be considered to be clean vehicles (e.g. are fuel-efficient conventional vehicles with low emissions "clean vehicles"?). A clear definition of clean vehicles and clean fuels, including life-cycle analyses, should be given on the European level to provide local authorities and other stakeholders with a common language and enable them to support clean vehicles in neutral and comparable approaches.

Recommendation 2:
Strengthen the status of soft measures in EU policies

Soft measures have proven to be cost - efficient and effective tools to tackle urban transport problems. Nevertheless they often seem to be neglected in discussions about the future direction of EU policies in the field of urban transport. The current discussion on the Urban Green Paper on Urban Transport is a chance to strengthen the role of soft measures as demand management strategies or mobility management approaches. The stimulated consultation on urban transport could help to better balance the focus of the Community's urban transport policy, without neglecting already strong topics such as the promotion of clean fuels and vehicles.

Recommendation 3:
Encourage development of SUTPs

NICHES experts stressed the importance of developing Sustainable Urban Transport Plans (SUTPs) for larger European cities to achieve a real impact on transport patterns within integrated strategies. While a directive on making SUTPs obligatory for cities with more than 100,000 inhabitants will not be realised due to objections from the national level, the EU should further evaluate how the concept of SUTP can be promoted through other channels. The Communication on the Thematic Strategy on the Urban Environment [COM(2005) 718] is a step into the right direction, but it needs to be concretised soon how the EU can most efficiently encourage the development of SUTPs. The EU disposes of a range of instruments to do this, e.g. guidance on SUTP (currently under development), training, best practice exchange & networking, demonstration projects (e.g. the current PILOT project) or the incorporation of the topic in future research activities. Particularly promising could be the funding of SUTPs within the EU's Structural Funds, within the "Interreg operational programs for trans-national cooperation". It should also be evaluated in how far the commitment to develop an SUTP could be made a funding requirement for urban transport measures within these programs. Serious incentives connected to a sufficiently attractive amount of funding could be a real driver for SUTP.

Recommendation 4:
Foster EU-wide promotion of and training on sustainable urban transport

The EC should take a stronger role in promotional activities and training within the field of urban transport. NICHES experts highlighted the need for a visionary framework for urban transport in European cities and to run European campaigns that make relevant actors at all levels aware of both problem dimensions and available solutions. In this context, more campaigns should be launched to promote the notion of "sustainable mobility". Such campaigns should not only target the general public but also policy makers across domains and levels to underline possible benefits of sustainable urban transport concepts. The EU activities in this field are still too often outside the view of decision makers on the national, regional and local levels.

It needs to be stressed that, in order to reach the audience, promotional activities must be in the languages and information channels of the member states. Currently, language barriers are not sufficiently addressed.

The increased provision of training (e.g. TRUMP programme) for urban transport stakeholders should be promoted and funded by the EC. Skill development has a high potential as it enables stakeholders to develop their expertise to better work towards sustainable transport solutions independently. Training should be understood in a wider sense, including direct training of technical staff, but also study tours for decision makers, or the integration of urban transport issues in academic programs.

Recommendation 5:
Continue support for EU-wide networking activities

The EC has already fostered many EU-wide networking activities in different fields of urban transport. NICHES experts highlighted the value of thematic networks that bring together expertise and experiences from different European cities and help to generate and promote innovation (e.g. the BESTUFS network funded within FP6). A continued and stable support for thematic networks with a long-term perspective is recommended as efficient way to promote the exchange of experiences (e.g. in the area of urban freight, urban transport innovations in general, noise reduction).

Recommendation 6:
Provide practical guidance on implementation

The EC should take a stronger role in providing practical guidance on implementing promising urban transport measures. This could be achieved by providing more project funding for such tasks. Guidance in different European languages that includes good practice examples from across Europe can encourage local stakeholders to become active themselves. Contact databases of experts on specific topics that can be approached in case of more detailed questions can also foster the uptake of innovative solutions. The NICHES approach is pointing into this direction.

NICHES experts saw a particular need to provide a European best practice guide on financing urban transport. Public budgets at all levels are under restraints, and there are many question marks among decision makers on how to address this. A best practice guide should provide an overview of concepts and provide new ideas on how to gain and secure funding of urban transport innovation, operation and maintenance. This could be a practical help for cities across Europe.

Recommendation 7:
Support standardisation activities for clean vehicles and road pricing

NICHES experts identified some areas related to the NICHES Innovative Concepts, where standardisation is lacking and poses barriers to the uptake of clean vehicles and road pricing schemes. The EC should support standardisation activities in the following areas:

- Standards for emission checks for clean vehicles are needed to gain consistent results in Europe and to foster clean vehicle uptake;
- Standards for noise emissions of vehicles (e.g. for night delivery services);
- Standards for road pricing technologies to facilitate technical harmonisation and interoperability.

Recommendation 8:
Provide adequate framework for urban road pricing

The EC sees “smart charging” in transport as essential to ensure fair and non-discriminatory prices for users, revenues for infrastructure investments, ways to fight congestion and discounts to reward environmentally more efficient vehicles and driving (Transport White paper review 2006). The London congestion charging scheme, which also has been examined in NICHES, is mentioned as good practice example. The EU legal framework and policy do not restrict urban pricing schemes, but do only little to facilitate implementation. The overarching legal framework for transport pricing is still very incomplete at the European level and relates entirely to heavy good vehicles.

The EU should, within the limitations given by the subsidiary principle, provide an enabling legislation for urban road pricing. This also requires addressing privacy concerns related to necessary monitoring and control within urban road pricing schemes. The EU should also continue work on the provision of a common methodology on charging (e.g. how to set marginal social costs).

Recommendation 9:
Review legislation and regulations for urban transport innovations

The project has brought to attention that the current legal and regulatory frameworks on the EU and national levels are potential barriers for the uptake of some urban transport innovations. This concerns licensing issues, competition rules, tendering, access (physical or data), as well as taxing or the provision of incentives. Public bicycles, for example, can be considered to be part of the public transport system, but in many countries they do not qualify as public transport service, with negative consequences for funding opportunities. Demand responsive transport services (e.g. NICHES Concept Call-a-bus) face serious restraints in some countries, as only line-bound services qualify for public transport funding. In the field of clean vehicles there may be national laws that are obstacles for market developments, e.g. safety regulations on refuelling various fuels. Questions of the lawfulness of incentives for the introduction of clean vehicles may also play a role.

NICHES could only touch on the issue of the legislative and regulatory frameworks. It was nevertheless highlighted by the NICHES experts that a review of legislation and regulations and their impact on the uptake of transport innovation on the EU and national levels is necessary. However, due to the lack of analytical information there is still much uncertainty about the feasible and desirable scope of interventions at a pan-European level and in which fields intervention is feasible at all. This requires a closer look at the topic, e.g. through research projects.

Recommendation 10:
Strengthen green procurement activities of clean vehicles

As described for the NICHES Concept Joint Procurement of Clean Vehicles[4], one of the most common problems when starting the introduction of clean vehicles is to find the right vehicle models on the market. By gathering a substantial amount of buyers it is possible to create the necessary demand that drives the market introduction of clean vehicle models forward and helps to lower the prices for new technologies.

While local and national levels play an important role in this, the EU should also continue to strengthen its support for green procurement activities. This can, for example, take the form of funding projects that aim at facilitating large-scale procurements of clean vehicles with participation of different European partners (as for example the PROCURA project). The EC's consultation on the promotion of Clean and Energy Efficient Vehicles within the preparation on the Green Paper on Urban Transport is also a step into the right direction. The Commission's proposal for a Directive on the support of clean vehicles by public procurement (COM(2005)634) and the broader approach proposed by the Council and European Parliament should be thoroughly discussed with concerned stakeholders to finally determine whether a directive is desirable and what it should look like. The EU should also consider promotional activities that spread good European examples and highlight the benefits of the procurement of clean vehicles for cities.

[4] see the NICHES policy note *Joint procurement of clean vehicles*, available on www.niches-transport.org

10 Conclusions

This brochure presents the **NICHES recommendations on research and EU policy**. It covers research topics, perspectives and formats and formulates 20 key research recommendations. Although not the main focus of the project, this brochure also summarises 10 policy recommendations to EU level decision makers that were brought to attention by the NICHES experts.

Some points can be highlighted particularly:

There is a **generally fair level of research on urban transport innovation** going on, although there are still many specific research gaps that have not yet been covered sufficiently. EU level and national research activities have contributed much to a better knowledge on the four NICHES thematic areas.

A problem, however, is the **lacking practical use of the available knowledge**. Current dissemination activities are not sufficient to reach the right stakeholders who implement urban transport innovation on the national, regional and local levels in an efficient way. Language barriers are mostly not properly addressed, which creates deficits in the accessibility of the research results. Therefore one of the key messages is to better use existing knowledge and to make new research results better accessible for the relevant stakeholders.

The NICHES experts also saw the **need to strengthen a range of research topics** in future research activities, covering policy and planning issues, land use and urban design, economic and social issues, the attractiveness of alternative transport modes and technology issues as well. The research gaps have been summarised for urban transport in general, and for the four NICHES thematic areas.

Regarding **research perspectives,** NICHES experts stressed the need for more interdisciplinary approaches and a better inclusion of all scientific disciplines that can contribute to a more sustainable urban transport system. This should also recognise the value of disciplines that are not well represented so far (e.g. behavioural psychology, economy, law, health science).

Research projects should also strengthen intersectoral partnerships to facilitate a cooperation of a wider range of different stakeholders who must come together to effectively address diverse urban transport problems.

Regarding **research formats,** an increased cooperation between fundamental and applied research is necessary. A key message from NICHES is that more research should have a practical value and more “Practical experiments” (e.g. demonstrations on a regional scale) should be run. Local authorities should be better recognised as end users of research results.

Training and exchange of experiences should be essential parts of research activities, to better spread knowledge and encourage discussions. Regarding the requirements for participation in EU projects, it was highlighted that administrative and payment procedures are still too complicated and pose a severe barrier for many stakeholders who are interested in EU level research, particularly for smaller partners or those that are new to EU research.

Within the **10 policy recommendations** to EU level decision makers, a key message is that the EU should take up a stronger role in providing definitions, guidance, promotional activities and training on sustainable urban transport issues. The value of soft measures should be better recognised and the EU should take further measures to promote the SUTP planning approach. Legal and regulatory framework conditions for the development and uptake of urban transport should be reviewed to provide an enabling context. Some topics like the procurement of clean vehicles are currently discussed on the EU level in the context of the preparation of the Urban transport green paper, which will help to define future EU activities for the field or urban transport more sharply.

The research and policy recommendations from the NICHES project are not exhaustive, but they can hopefully give a valuable input to future EU research programmes and policy strategies in the field of urban transport.

11 Further information & contacts

Further information

In the table below you can find the **contact details of the NICHES Consortium partners**, whom you can contact for more information on the NICHES project, its thematic areas and general information on the NICHES concepts

You can find **all NICHES brochures with further information on the NICHES website:**

www.niches-transport.org

This report has been prepared with the **support of urban transport experts** (through their participation in the NICHES focus group meetings and a written survey).

For further information on the specific Innovative Concepts, you can contact the experts involved in the NICHES project. Their contact details are available on **OSMOSE, the portal for urban transport innovation** launched in the framework of NICHES:

www.osmose-os.org (see link to “experts”)

Table 2: NICHES Consortium contact details

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Innovative Approaches in City Logistics									
Forkert	Silke	PTV Planung Transport Verkehr AG	DE	silke.forkert@ptv.de	+497219651 177	Stumpfstrasse 1	76131	Karlsruhe	www.ptv.de
Wild	Dieter	PTV Planung Transport Verkehr AG	DE	dieter.wild@ptv.de	+497219651 177	Stumpfstrasse 1	76131	Karlsruhe	www.ptv.de
New Non-polluting and Energy Efficient Vehicles									
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The mission of NICHES is:

to stimulate a wide debate on innovative urban transport and mobility between relevant stakeholders from different sectors and disciplines across Europe.
NICHES promotes the most promising new concepts, initiatives and projects, to move them from their current 'niche' position to a 'mainstream' urban transport policy application.

NICHES team

The NICHES consortium is composed of a variety of experts in the field of urban transport, ensuring the knowledge of the academic sector (Warsaw University of Technology), the experience of cities (Stockholm), the expertise of consultants (Rupprecht Consult, PTV Planung Transport Verkehr AG) and the multiplyer effect of the networks (POLIS, EUROCITIES, CEMR).

City of Stockholm
Environment and Health Administration

For more information contact the NICHES consortium partners (contact details available on the last page) or visit:

www.niches-transport.org
www.osmose-os.org

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