Master Thesis within the Framework of Utrecht University's Sustainable Development Programme of the Faculty of Geosciences

Environmental Policy Integration in Urban Passenger Transport Sector

An assessment of coordination mechanisms across European cities

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Utrecht, July 4th, 2012

Acknowledgements

I would like to express my deep gratitude to Dr. Hens Runhaar, my thesis supervisor, for his guidance, suggestions and useful critiques of this research work. Without his patient guidance I would have never been able to accomplish such level of scientific rigor. In addition, I would like to thank Dr. Frank van Laerhoven for his valuable theoretical advice to formulate the research hypotheses.

I owe great thanks to the amazing master colleagues and friends I was fortunate to meet in Utrecht. My special thanks to Adolfo, Sofia and Tiago for all the good moments shared together and for lifting up my motivation during the less enjoyable days. Anna, Andreas, Diogo, Marthe, Kiriakos, Eko and David, you too are worth of being mentioned here as exemplar colleagues you were and great friends you are.

I would also like to thank the support of my relatives, especially, Rui, Bruno, João and Odilia. I owe special thanks to my brother Rui for his great help ever since my application to this master programme.

Finally, and above all, I am extremely grateful to my parents. Their constant support and encouragement were determinant for closing this chapter and moving on to other exciting ones in my life.

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List of Abbreviations

CMEPI	Coordination mechanisms to Environmental Policy Integration
EFUPTM	Environmentally Friendlier Urban Passenger Transport Measures
EIA	Environmental Impact Assessment
EPI	Environmental Policy Integration
EU	European Union
EC	European Commission
GDP	Gross Domestic Product
NGO	Non-Governmental Organization
ENGO	Environmental Non-Governmental Organization
OECD	Organization for Economic Co-operation and Development
PI	Policy Integration
PT	Public Transport
SEA	Strategic Environmental Assessment
SUTP	Sustainable Urban Transport Plan

Definitions

Policy Integration (PI)

Policy Integration is defined as "*the management of cross-cutting issues in policy-making that transcend the boundaries of established policy fields, and which often do not correspond to the institutional responsibilities of individual departments" (Meijers & Stead 2004, p.2).* In other words, within urban planning, policy integration is a policy making procedure that manages the cross-cutting issues of environmental, land-use, transport, social, and other urban sectors, and ensures more coherent and social beneficial outputs than non-integrated policy making procedures.

Environmental Policy Integration (EPI)

EPI is defined by Hey as an "*early coordination between sector and environmental objectives, in order to find synergies between the two or to set priorities for the environment, where necessary*" (Hey, 2002, p.127 in Persson 2004). EPI is generally understood as the integration of environmental objectives into non-environmental sectors policy making. In line with the concept of Policy Integration, EPI is a policy making procedure that includes environmental goals and considerations in the early stages of policy making, with the aim of identifying synergies and variances of measures that meet sector specific goals within minimum or accepted levels of environmental impacts.

Environmentally Friendlier Urban Passenger Transport Measures (EFUPTM)

Passenger transport policy represents the process of regulating and provisioning passenger transport services by governmental and non-governmental actors (Tolley & Turton 1995). Within passenger transport policy, Environmentally Friendlier Urban Passenger Transport Measures (EFUPTM) stands for the set of measures that reduce the environmental impacts of passenger transport systems in highly populated areas[1]. For the scope of this research, EFUPTM stand for measures that: a) promote a modal shift from car to non-car travel modes (e.g. improvement of Public Transport network, accessibility, and safety of public transportation, cycling and walking modes of travel); b) reduce the environmental effects of certain urban travel modes (e.g. traffic calming and subsidizing the purchase of greener vehicles); and c) reduce the need for urban travel (e.g. a concentrated land-use and transport oriented development of urban settlements). Note, however, that measures to increase the on-line provision of urban services (e.g on-line shopping, on-line working, and e-learning) were not considered and assessed by the research.

Altogether, EFUPTM stands for an overall set of measures that collaboratively increase the environmental performance of urban passenger transport systems.

Coordination mechanisms to EPI (CMEPI)

Coordination mechanisms to EPI (CMEPI) stands for multi-scale, multi-sector and multi-actor tools, strategies and procedures that promote the adoption of a) environmental considerations, and b) cross-sector trade-offs (or externalities) in policy making and service provision. These mechanisms are divided into: a) government based mechanisms (e.g. Environmental Impact Assessment (EIA), Strategical Plans for EPI); market based

[1] For the scope of this research, "*highly populated areas*" is a region with more than 80.000 inhabitants and density above 800 inhabitants/Km^2

mechanisms (e.g. competitive tendering contracts); and c) civil society based mechanisms (e.g. an environmental non-governmental organization participating in policy planning or monitoring the performance of public and private operators in the passenger transport provision).

Abstract

Environmental Policy Integration (EPI) represents a policy principle and procedure to minimize the negative environmental impacts of sector policy measures by addressing these impacts at the early stages of policy formulation. EPI gained wider visibility in the Brundtland report in 1987, following the acknowledgement that business-as-usual policy making was not being effective to meet sector specific goals within satisfactory levels of environmental preservation.

Despite the increasing support for EPI, a number of case studies show that EPI has not yet achieved satisfactory levels of adoption. In addition, few studies have been conducted to measure and explain EPI adoption and effectiveness over a large number of units of analysis. In this consideration, this master thesis dissertation aimed to perform an evaluative analysis of EPI, both at the procedural and output level, across several European cities, with a focus on the urban passenger transport sector. The research was designed to unveil the current stand point of EPI in urban passenger transport policies across European cities and to seek explanations for different ranks of EPI adoption, both at procedural and output levels. More specifically, the research focused in studying two relationships: i) EPI at the output level (dependent variable) and EPI at the procedural level (independent variable); and ii) EPI at the procedural level (dependent variable) and explanations for its adoption (independent variable).

The research started by reviewing the challenges for EPI found in the literature. Then, it outlined the most relevant coordination mechanisms for EPI (CMEPI), EPI at the procedural level, which were defined as multi-scale, multi-sector and multi-actor tools, strategies and procedures that promote the adoption of environmental considerations and cross-sector trade-offs in policy making and service provision. The CMEPI were divided into governmental (e.g. EIA), market (e.g. competitive tendering contracts) and civil (e.g. ENGO) dimensions. Subsequently, the research presented the package of environmentally friendlier urban passenger transport measures (EFUPTM), EPI at the output level, classified as the set of measures that a) promote a shift in car to non-car travel modes, b) reduce the environmental effects of certain urban travel modes, and c) reduce the need for urban travel, at least to a certain extent. In addition to these endogenous variables, the research reviewed the exogenous variables likely to affect the adoption of EFUPTM and CMEPI. Research hypotheses for the study of the two relationships were withdrawn from theory on polycentric governance and local collective action. The research hypothesized that *more polycentric forms of environmental governance, represented by the multi-scale, multi-sector and multi-actor tools coordination mechanisms promoting EPI*, *would trigger a higher adoption and effectiveness of EFUPTM* (hypothesis 1). In addition it was hypothesized that *contextual factors exerted high influence on the adoption of coordination mechanisms promoting EPI by local actors* (hypothesis 2). An on-line survey was built and constituted the research method of analysis, in which the data retrieved was mainly of ordinal nature.

Research findings evidence a higher adoption of government based CMEPI, followed by civil society ones. Market based CMEPI are, generally, rarely adopted. In terms of EFUPTM, measures promoting modal shift towards public transportation were the most common, followed by integrative land-use and transport policies, and cycling and walking measures. Of rarely adoption are urban road pricing measures. The research concludes that the set of polycentric CMEPI presented by the research stands for higher adoption of EFUPTP, when exogenous conditions (as legitimacy and financial resources) are favourable.

In addition, research findings also evidence that a higher adoption of CMEPI is very dependent of contextual factors.

A first recommendation to further advance EPI is to equip cities with proper conditions for CMEPI adoption. This can be done, for example, by: a) establishing cooperation networks between cities, to increase knowledge and diffusion on the best practices for EPI in transport sector; b) advancing external financial benefits for CMEPI at the local level; and c) rising the involvement of civil society and specific environmental NGOs in the process of transport planning and environmental supervision.

Another recommendation for cities and transport planners is to focus their efforts on extending the development and adoption of polycentric CMEPI, as the ones outlined by this research. Special attention should be paid on extending CMEPI at the market level (e.g. subcontracting out services, setting up environmental performances as awarding criteria, environmental code of conduct for the industry), as these were found limitedly adopted in many of the surveyed cities.

1. Introduction

Environmental Policy Integration (EPI) is a policy-making procedure that promotes the integration of environmental objectives into non-environmental sectors, and it has emerged as a key principle for an environmentally friendlier development (Lenschow 2002a, Lafferty & Hovden 2003). The recognition that sectoral policies, when only pursuing their sectoral specific goals, were unable to solve the increasing complexity and fragmentation of environmental problems, prompted the appearance of EPI in the Brundtland report in 1987, as a necessary principle and procedure for sustainable development (Lafferty & Hovden 2003). Since then, and given the increasing acknowledgment of the cross-sectoral nature of most environmental problems, many academic and policy documents have advocated the need to integrate environmental considerations across all sectors of societies (Geerlings & Stead 2003).

Despite the rising support for EPI, many challenges fall upon its full achievement, either from the theoretical stand point of view, given the broader definitions and study approaches available within the literature[2] (see for example Lafferty & Hovden 2003, Persson 2002, 2004), or from the implementation side, given the initial prioritization of policy making on economical and sectoral-specific goals, in detriment of environmental ones (Geerlings & Sluis-van Meijeren 2008). On top of these challenges, the increasing fragmentation of policy making over the last decades, resulting from the emergence of new actors involved in policy making, the dispersion of knowledge among these actors, and the rise of decentralized governments, highlighted the importance of coordination for an effective policy formulation and implementation (Jessop 1998, Geerlings & Stead 2003, H-ooghe & Marks, 2003 Meadowcroft 2007). In generic terms, coordination of policy-making and service provision represents an institutional precondition for consistent and mutually supportive policy measures, intra and across sectors (Underdal 1980, Peters 1998, Hooghe & Marks 2003, Verhoest et al. 2005).

Several studies have already pointed out the necessary Coordination Mechanisms for EPI (CMEPI), henceforth defined under this research as tools, strategies and procedures promoting the adoption of environmental considerations and cross-sector trade-offs in policy making and service provision (see for example Hertin & Berkhout 2003, Lafferty & Hovden 2003, Jacob & Volkery 2003, Simeonova & Valk 2009, EEA 2005, ESDN 2009). However, fewer studies have tested its effectiveness (Lenschow 2002a, Persson 2004). The majority of EPI evaluation studies are focused on the procedural level of EPI. Still, authors have recommended that EPI assessment should be simultaneously performed at the procedural and output levels, in order to assess if procedural forms of EPI are preceded by effective environmental outputs and outcomes than non or less integrated forms of policy making (Lenschow 2002b, Mickwitz & Kivimaa 2007, Simeonova & Valk 2009). As stated by Persson (2004, p.23): "*both process and output are important, (…) understanding the linkage between process and output is what really adds value to an EPI study. It would hopefully lead to answers both to how integration can be achieved and if the resulting outputs are satisfactory in relation to the environmental problems*".

The research is focused on Environmental Policy Integration in Urban Passenger Transport across European cities. Considering that environmental problems are human-

[2] The number of studies approaches to EPI is a consequence of o the number of definition available within literature and hence the different EPI variables under study (for more detailed information on the different approaches to the study of EPI please refer to Persson (2004) and Lafferty & Hovden (2003).

induced and given the increasing urbanization of present societies[3], it is important to address urban systems (such as water, waste, food, energy, transportation, land-use) as the most relevant dimensions where environmental problems emerge (see for example O'Meara 1999, Williams 2005). A good example of such case are urban transportation systems, which confront the way urban passenger transport is provided and regulated with how citizens choose their urban travel modes to fulfil their needs. Studies have illustrated how current passenger transport systems are usually associated with significant negative environmental impacts. This is the case of cities in lack of feasible urban travel alternatives to cars and with a poor management of travel needs, which not only account for higher environmental costs but also for economic and social ones (Kenworthy & Lwaube 1999, Ison & Rye 2008). In this regard, policy measures aiming to a) promote non-car travel modes, b) reduce traffic emissions, and c) reduce the need of urban travel, are necessary to uplift the environmental performance of current urban passenger transport systems. These policies are labelled by the research as Environmentally Friendlier Urban Passenger Transport Measures (EFUPTM).

The research is focused on the study of two relationships: i) Environmentally Friendlier Urban Passenger Transport Measures (dependent variable) and coordination mechanisms for EPI (independent variable); and ii) coordination mechanisms for EPI (dependent variable), and explanation for their adoption (independent variable). The purpose is to: a) explore the extent to which CMEPI (EPI at the procedural level) and EFUPTM (EPI at the output level) have been adopted by European cities; b) understand if integrative forms of environmental policy making are, from the environmental stand point of view, more effective than less integrative or traditional policy making; and c) seek explanations for different ranks of CMEPI adoption.

The social and scientific relevance of the research relies in its attempt to perform an evaluative analysis of EPI, both at the procedural and output level, and for which few studies have been conducted, as well as to disclose the current situation of EPI in the urban passenger transport sector across a number of European cities. The assessment is not extended to the EPI outcome level, as the research method used for assessment (one-time assessment) is ineffective to isolate the range of exogenous factors influencing environmental impacts.

The overall question the research aims to answer is the following:

Which Coordination Mechanisms for Environmental Policy Integration have been adopted by European cities; and why and to which extent do they promote more Environmentally Friendly Urban Passenger Transport Measures?

To answer this question, the research needs to elaborate the following ones:

1- Why, and to which extent, have coordination mechanisms for EPI within Urban Passenger Transport Policies been adopted by European cities?
2- How far have European cities gone in implementing environmentally friendly urban transport policies?
3- In which way(s) do coordination mechanisms for EPI promote more environmentally urban transport measures across European cities?

[3]In 2011 urban areas were estimated to accommodate more than 50% of the world population. If only considering developed countries, this figure rises to 75% (PRB 2011)

The research is organized as follows. The next section (2) outlines and generally justifies the research strategy. Section 3 presents the theoretical and conceptual framework of the research, which is later adapted for the study of EPI in urban passenger transport sector. Following it, section 4 presents the research results. The final section of this work deals with the research conclusions, recommendations for further research on EPI and presents policy recommendations for EPI.

2. Research Methodology

Two research strategies were employed by the research:

- Desk research was conducted to operationalize the key concepts and the research hypotheses, and to define the research framework. Section 3 presents the general theoretical and conceptual framework for EPI analysis, which is then operationalized for urban passenger transport sector.

- Answering of research questions takes place by means of a single time online survey assessment. The survey was chosen as the most appropriate method because i) a quantitative and large unit analysis was desired to test the research hypotheses and generalize conclusions; ii) the research was short in time and financial resources and the survey constitutes an effective time-cost method for retrieving data over a high number of analysis units; and iii) the type of data required by the research was neither covered by case studies nor by any electronic data source. The online survey consisted of a questionnaire, which was built upon the conclusions drawn of the literature review during the desk research phase.

3. Theoretical and conceptual framework

This chapter defines the theoretical foundations of the research and sets up the general conceptual model for EPI analysis, which is later specified for urban passenger transport sector. The section starts by reviewing the definition of EPI and its origin (3.1). It then defines and conceptualizes both the coordination mechanisms promoting EPI (3.2) as well as environmentally friendly policy measures (3.3). Literature review was then conducted to outline the factors explaining the adoption of environmentally friendly measures and of coordination mechanisms promoting EPI (3.4). Finally the same steps are specified for the urban passenger transport sector (sections 3.5, 3.6 and 3.7). Alongside the specification, case-situations of the topics discussed are illustrated to bridge, whenever possible, the research considerations with evidences from real cases.

3.1 Environmental Policy Integration (EPI)

Environmental Policy Integration is a policy-making principle and procedure referring to the integration of environmental objectives into non-environmental policy sectors (Lafferty & Hovden 2003). Its first broader appearance took place with the publication of the Brundtland report in 1987 (WCED 1987), in which a fragmented policy arena and an increased complexity of environmental problems, associated with failures of traditional sector-independent policy making to protect the environment, opened ground to EPI supportiveness as a necessary principle and procedure for sustainable development: "*The objective of sustainable development and the integrated nature of the global environment/development challenges pose problems for institutions, national and international, that were established on the basis of narrow preoccupations and compartmentalized concerns.(…)Yet most of the institutions facing those challenges tend to be independent, fragmented, working to relatively narrow mandates with closed decision processes. Those responsible for managing natural resources and protecting the environment are institutionally separated from those responsible for managing the economy. The real world of interlocked economic and ecological systems will not change; the policies and institutions concerned must."* (WCED 1987, p.17)

Following the Bruntland report, several intra-national policy documents and institutions, such as Agenda 21, OECD and EU, have too pointed out to EPI as a key procedure for environmental protection, recommending its adoption by national and local governments (Lenschow 1997, Geerlings & Stead 2003, Persson 2004). These documents have outlined the institutional steps that both national and local governments should undertake to reach policies favouring a more effectively environmental preservation (see for example OECD 1996, 2001a, 2001b, Expert Group on the Urban Environment, 1996).

Despite its increasing support, EPI has shown a slow pace in being implemented effectively. The main reasons presented by authors address the initial set up of policy departments, which were mainly focused on their sector specific-goals and, as such, have not undergone environmental and externalities impact assessments of their policies, as well as the institutional inability of departments to move towards more integrative forms of policy making, where EPI is included (Lenschow 1997, 2002a, Geerlings & Sluis-van Meijeren 2008). Adding to the institutional challenge of integrative policy making was the increased fragmentation of policy making experienced by governments after 1970, which brought the challenge of integrating environmental considerations over a wider set of actors and

territorial scales (Kettl 2002, Salamon 2002, Frederickson & Smith 2003, Hooghe & Marks 2003, Rayner & Howlett 2009). This phenomenon, also defined by some authors as "governance" (Stoker 1998, Jessop 1998), led to the emergence of a more dispersed policy making arena, as the result of a higher decentralization of governments and a rise of non-state actors' involvement in policy making and public service provision.

Alongside the challenges for implementing EPI stands the number of conceptual approaches for its study. Studies tracing back the origin of EPI concept, found that "integration" can hold various similarities with other terms, such as "coordinantion", "coherence", "consistency", "collaboration", and "co-operation" (Hogl 2002, Geerlings & Stead 2003, Persson 2004, Rametsteiner, Bauer & Weiss 2010). As a result, several conceptual models of EPI were developed by different authors (see Hertin & Berkhout 2003, Lafferty & Hovden 2003, Jacob & Volkery 2003, EEA 2005, Simeonova & Valk 2009, Grijp, Biermann & Davies 2009, ESDN 2009). Avoiding the fuzziness of its concept, this research adopts the definition of EPI proposed by Hey, defined as "*an early coordination between sector and environmental objectives, in order to find synergies between the two or to set priorities for the environment, where necessary*" (Hey, 2002, p.127 in Persson 2004). In generic terms, EPI is a policy making procedure that includes environmental goals and considerations in the early stages of policy making with the aim of identifying synergies and variances of policies that meet sector specific goals within minimum or accepted levels of environmental impacts.

Based on the above definition, it is easy to recognize that the study of EPI can be conducted at the procedural, output and impact levels (for an extensive discussion of the concept and study operationalisation of EPI please read Persson 2004). At the procedural level, one is interested to study how are environmental considerations addressed throughout the policy-making procedure**.** As a policy output, the study is confined to the outputs of the policy process (policy measures), more precisely on how effectively do policy measures meet sector goals within minimum levels of environmental degradation. Finally, at the impact level, one is interested in assessing the linkage between outputs and environmental impacts. Although these dimensions can be study independently, the key point is to study them together to understand how effectively procedural EPI achieves EPI outputs and how effective are the latter ones in reducing environmental impacts while reaching sector specific goals.

It is important to point out that not every policy making should be integrative, as there is an optimum desirable degree for policy integration. In the words of (Scharpf 1994, in Sager 2006, p. 442), coordination "*is desirable whenever the level of aggregate welfare obtained through the unilateral choices of interdependent actors is lower than the level which could be obtained through choices that are jointly considered*". As a general rule, whenever negative environmental impacts are minimal or the costs of implementing EPI procedures exceed the benefits of its outputs, traditional or independent policy-making procedures should be preferred over EPI. Consider, as an example, the case of a fiscal department that wishes to levy a tax on three cases: 1) road circulation; 2) essential goods; or 3) luxury goods. In the first case, levying a tax on road circulation triggers negative externalities on mobility and on the economical attractiveness of a region, and adds positive externalities on the environment. In order to best balance these trade-offs, it is of best practice for the fiscal department to consider environmental and social impacts and liaise with environmental and social departments when defining the best tax range. The tax range should mutually meet the economical, mobility and environmental goals defined for the area. In the second case, levying a tax on essential goods, it is also preferable that policy

making should be integrative, in this case, of social considerations. The considerations could be, for example, the average purchasing power of citizens, to be taken in consideration when defining the social optimum tax rate on essential goods. In some cases it might be necessary to define a differentiated tax range within regions. For example, it might be more efficient to have lower taxes in remote areas, whose final consumer prices are increased by the lack of efficient transport infrastructure. The third option, levying a tax on luxury goods, mainly addresses economic considerations and few environmental or cross-sectional externalities. Thus, an efficient policy is likely to be less costly and still effective when carried out entirely and independently by the economic department without conducting environmental and cross sector impact assessments.

3.2 Coordination mechanisms promoting EPI (CMEPI)

Coordination in policy making can be defined as the "*alignment of tasks and efforts of multiple units in order (…) to create greater coherence in policy, and to reduce redundancy, lacunae and contradictions within and between policies*" (Verhoest et al. 2005, p.4). Policy coordination enhances the effectiveness of policies as "*policies of one jurisdiction have (negative) spillovers for other jurisdictions, so coordination is necessary to avoid socially perverse outcomes*" (Hooghe & Marks 2003, p. 239), and ensures "*that the various organizations – public and private – charged with delivering public policy work together and do not produce either redundancy or gaps in services*" (Peters 1998, p.5). In generic terms, policy coordination is an institutional precondition for a) intentional mutually supportive policies across sectors and actors, and b) lower trade-offs and inconsistencies between policies.

Coordination in policy making became widely advocated following an a) increasingly fragmented policy arena, with the rise of decentralized governments and the entrance of new actors in policy making and service provision, and b) the need to turn policies and public services more effective and efficient by removing redundancy and contradiction policies, typically characteristic of independent policy making procedures (Lowndes & Skelcher 1998, Peters 1998, Hooghe & Marks 2003).

In result of a more dispersive policy making arena and the poor environmental performance of business-as-usual policy making procedure, authors have recalled for innovative forms to enhance the environmental performance of urban services (Tews, Busch & Jorgens 2003, Jordan, Worzel & Zito 2003, Lemos & Agrawal 2006, Herodes, Adelle & Pallemaerts 2007). These forms address new relationships and instruments of environmental management between state-market-society (e.g. regulation, self-regulation, market based instruments and voluntary agreements) (Lemos & Agrawal 2006).

Although conceptualizations of coordination mechanisms within literature mainly vary between "multilevel governance" (Aalberts 2002, Hooghe & Marks 2003, Briassoulis 2004 Betsill & Bulkeley 2005, 2006, Jordan 1999, Corfee-Morlot et al, 2009, Lenschow 2007, Herodes, Adelle & Pallemaerts 2007) and "horizontal and vertical coordination" (ESDN 2009, ECMT 2006, Lafferty & Hovden 2003, Hull 2008, EEA 2005, Nykvist 2008), their implications are alike. Both terms acknowledge the existence of a fragmented and inter-dependent urban context, across territorial levels, sectors and actors, and the need of coordination between these arenas for coherent and consistent policies and services.

Coordination mechanisms for EPI are thus employed by the research as multi-scale, multi-sector and multi-actor tools, strategies and procedures that promote the adoption of i) environmental considerations and ii) cross-sector trade-offs (or externalities) in policy

making and service provision. These mechanisms are divided in: a) government based mechanisms (e.g. Environmental Impact Assessment of public programs); market based mechanisms (e.g. competitive tendering when outscoring services); and c) civil society based mechanisms (e.g. an environmental non-governmental organization participating in policy planning or monitoring the environmental performance of public and private operators).

3.2.1 The relevance of coordination mechanisms for EPI: some examples

"Unpicking environmental policy integration with tales from waste management"

In their study of EPI in UK municipalities' waste management services, Watson, Bulkeley and Hudson (2008) show how the process of uplifting the environmental performance of waste policies has been mainly hampered by an improper coordination of multi-sector and multi-scale actors: "*The realisation of such (environmental) outcomes depends on the appropriately integrated action of institutions, both state and nonstate, and of policy processes, at all scales of government. Ultimately, it is how the policies and instruments of integration impact on the microscale processes, relations, routines, and decisions of policy implementation that determines the outcomes of EPI*" (p. 496). The failure of UK to further integrate environmental considerations into municipal waste policy was mainly the result of insufficient policy coordination at the local level, where waste services are ultimately delivered and provisioned. Although UK had reach good coordination levels at higher scales of governance, it was not the case at the local level, where fragmented and competitive institutions persisted: "*Perhaps most fundamental is a typical lack of coordination between the section of an authority responsible for waste management and the section responsible for land-use planning, which includes planning for waste infrastructure. (…) The split between planning and management results in basic breakdowns of intra-institutional integration. This is, perhaps, most visible in the sequencing of the strategies that local authorities are required to produce relating to waste. On the side of waste management, DEFRA requires the production of a MWMS. On the side of land-use planning, DCLG (at the time, ODPM) until recently required a waste local plan (WLP) or equivalent provision. Logically, production of the two documents would run in concert with each other, with the strategic document (the MWMS) shaping the planning document (the WLP)"* (p. 491).

The study also supports that EPI is not likely to be achieved by merging institutions as a stand-alone coordination mechanism to overcome the lack of integration between two conflictive sectors, as it is the case of waste management and land-use planning, given the different *modus operandi* of each: *"The time frames of management and of planning working practices are very different. Whilst waste management involves long-term contracts and relatively short decision-making procedures, more drawn-out processes of plan making, contestation, and infrastructural development are central to the planning process. Such differences cannot simply be overcome by `joining up' government departments"* (p. 491).

"Environmental integration and policy implementation: competing governance modes in waste management decision making"

A similar analysis of EPI in waste management, across five Swedish cities, was conducted by Nilsson, Eklund & Tyskeng (2009). The authors pointed out the existence of several coordination discrepancies within the waste sector, among which, a poor local waste

planning, a national policy context unable to guide and steer local waste decision making, and the lack of assessment tools and knowledge for long term policy planning, which affected EPI in waste sector. In addition, the study also makes reference to binding coordination mechanisms as being more effective than voluntary agreements and management by shared goals, given the institutional implementation gaps faced by the latter ones: "*The application of new instruments appears to be lacking supporting institutions, normative structures, and knowledge systems that would appear necessary to render them effective. Such structures would be necessary since new modes often rely on voluntary action, ownership, and devolved responsibility.*" (p.13)

3.3 Environmentally friendly policy measures

Environmentally friendly policy measures are the set of policy measures that achieve sector specific goals within minimal or acceptable levels of environmental degradation. Conceptualizing this definition, one can either have: i) a policy measure whose environmental impacts are minimized by choosing a variance of a measure that best meets environmental and sector-specific goals (e.g. allow the development of industrial settlements within a ceiling level of environmental pollution, or to implement an increasing tax rate on environmental impacts, which eventually increases the incentives for less environmentally burden ways of production) ; or ii) a combination of policy measures whose negative impacts are complemented by positive environmental externalities of other measures (e.g. deforestation of one area is only permitted if complemented by a reforestation process on a nearby area).

3.4 Factors explaining the adoption of environmentally friendly policy measures and of coordination mechanisms for EPI

Now that both coordination mechanisms for EPI and environmentally friendly policy measures have been defined and conceptualized, it is relevant to understand what explanatory factors promote their adoption.

3.4.1 Factors explaining the adoption of environmentally friendly policy measures

Many authors have theorized on the explanatory factors promoting environmentally friendlier policy measures. A good summary of these is made by Persson (2004), who draws three general categorizations of factors promoting EPI at the output level: organizational, procedural, and normative. As conceptualized by the author, organizational factors refer to how actors, departments and levels of governance, involved in the process of policy making and service provision, are organized. These factors are explicitly related to the organizational mechanisms, such as accountability and communication tools, that overcome policy fragmentation and mitigate policy measures trade offs. In turn, procedural factors are policy procedures aimed at turning sector policies more environmentally balanced by including environmental strategies and mechanisms, such as environmental impact assessment, sector specific strategies and plans for environmental protection, within policy making

procedures. Finally, normative factors represent all the remaining factors that are not represented by the organizational and procedural factors. These include factors such as political support, level of knowledge, financial resources, and contextual dependency - which are considered by the research as external variables determining the adoption of sector policy measures within minimized environmental impacts.

It is imperative, however, to make an important remark. Factors promoting EPI should be framed in accordance to the research goal. As mentioned by Persson (2004, p.26) "*It is notable how the framing of the EPI problem influences the perception of what means are necessary, purposive and effective to enhance the EPI process. (…) Placing EPI in a specific context involves making certain assumptions regarding the nature of the problem and the interests and motives of actors involved*". Once the research focus is on coordination mechanisms promoting EPI, these three factors will be re-categorized into two. The first category represents the coordination mechanisms for EPI, as defined and conceptualized in section 3.2, which include both organizational and procedural categories described in the previous chapter. The second represents the normative factors as presented above but labelled instead as exogenous factors – all non-coordination mechanisms factors that determine the adoption of environmentally friendly policies. By adapting these considerations we arrive to the conceptual model adopted by the research to study EPI at the output level (figure 3.4.1).

Figure 3.4.1 – Factors promoting the adoption of environmentally friendly policy measures

Category	Factor	Description
Endogenous factors	- Coordination Mechanisms promoting EPI	Tools, procedures and strategies that a) overcome policy fragmentation and mitigate policy measures trade offs and b) promote the adoption of environmental considerations in policy making and in service provision.
Exogenous factors	- Political commitment	Level of legitimacy and leadership that influences the implementation of measures
	- Societal backing	
	- Time dependency	Past policy measures and current policy prioritization affecting the implementation of measures
	- Knowledge and scientific resources	Level of resources determining the identification or implementation of policy measures
	- Financial resources	
	- Cultural and geographical characteristics	Characteristics of the region, values and cultural aspects that influences the implementation and effectiveness of measures

Source: adapted from Person (2004, p. 36)

The subsequent paragraphs draw literature findings on policy making and service provision at the municipality levels, with the aim of formulating the first research hypothesis.

The study of conflictive approaches on coordinating public policies and service provision at the metropolitan level, also known as metropolitan urban governance, can be traced back to the second half of the 20th century. Back then, Charles Tiebout (1956) and Elinor Ostrom (1972) confronted the dominant view of consolidated governance theory with a more fragmented and polycentric governance approach, as the most effective and efficient system to manage urban services and problems (Lowery 2001, Hooghe & Marks 2003). Subsequent research on the delivery of municipality services evidenced that fragmented governance systems stood for more efficient and effective public services as opposed to more consolidated governance (Ostrom, Parks & Whitaker 1978, Boyne 1992, Parks 1985, Ostrom & Parks 1999, MDL 2007). Theoretically speaking, polycentric governance stands for an institutional design where no single actor enjoys a full governing authority, and whose interactions among governmental and non-governmental actors, either by competition or collaboration, are a pre-requisite for more effective policy making and service delivery: "*'Polycentric' connotes many centers of decision making that are formally independent of each other. (…) To the extent that they take each other into account in competitive relationships, enter into various contractual and cooperative undertakings or have recourse to central mechanisms to resolve conflicts, the various political jurisdictions in a metropolitan area may function in a coherent manner with consistent and predictable patterns of interacting behavior*" (Ostrom, Tiebout, & Warren 1961, p. 831). The features of a more polycentric governance system are varied. Firstly, intra-governmental and non-governmental linkages in the governing process potentially trigger more effective and efficient policies (Bish 2001, McGinnis 2005, MDL 2006); linkages with civil society can tailor policies and public services to citizens' preferences; linkages over intra-governmental departments eventually foster coordination and synergies in policy making; and linkages with private actors are likely to evolve into situations where public services provisions are more cost-efficient delivered. Secondly, polycentric modes of governance react quicker to urban problems and tend to be more innovative (Wagner 2004, Ostrom 2010, Toonen 2010). An initial answer to problems can spin-off from the non-government dimensions in case government's reaction lags. In certain situations, non-governmental actors might be better equipped (e.g. resources and skills) than governments to tackle urban problems. In addition, by turning non-governmental actors more active in the process of governance, responsibilities for solving urban problems are being shared (Ostrom & Walker 1997, Stoker 1998, Feiock 2008). This avoids the existence of "monopolies" in public governance and promotes collective action to tackle the complexity of urban problems.

Although multilevel polycentric forms of governance are currently accepted as the institutional model to better tackle local, national and international problems (Falkner 2003, Andersson & Ostrom 2008, Grijp, Biermann & Davies 2009, Feldman n.d.) the debate within metropolitan public services seems to be shifting to how governance should be organized under its multilevel dimensions. Liesbet Hooghes and Gary Marks (2003) clearly state this challenge: "*Should jurisdictions be designed around particular communities, or should they be designed around particular policy problems? Should jurisdictions bundle competencies, or should they be functionally specific? Should jurisdictions be limited in number, or should they proliferate? Should jurisdictions be designed to last, or should they be fluid?*" (p. 236). The authors present two types of jurisdictions: the "type I, *general-purpose jurisdictions*", where only one jurisdiction is responsible for the overall problems of their territorial boundaries;

and the "type II, *task-specific jurisdictions*", where a given territory boundary accounts for multi specialized jurisdictions to solve its problems. In practical terms, jurisdictions should be used mutually and complementarily. The type I represents the primary governance structure, which should be backed with type II jurisdictions whenever significant trade-offs exists across type I jurisdictions (McGinnis 2005). The traditional approach to set up the type of jurisdiction was merely economic, in maximizing the scale of production as a mean of minimizing cots. However, this assertion has been refuted by some authors (Bish 2001, McGinis 2005). Firstly, citizens' service preferences are not always homogeneous. Thus, large scale production is unfeasible to accommodate the diversity of preferences. Secondly, not every public service yields the virtue of being provided under economies of scales. Thirdly, research has shown that public services can be provided effectively and efficiently at lower regional levels, for instance, by subcontracting them to private parties, more efficient than state provision (Ostrom & Parks 1999). Fourthly, it is unlikely that any monopolistic situation, even if yielding economies of scale, will be efficient.

New assertions on the scale and typology of jurisdictions, either type I, type II, or a combination of both, support that optimum allocation of jurisdictions should be the result of the governance interactive process. As stated by Bish (2001, p.5), this interaction represents the processes "*through which local governments are created or changed and responsibility for different functions is determined; processes by which citizens select officials, perhaps vote directly on specific initiatives, and communicate with officials either individually or through groups; processes by which officials decide what to regulate or produce, how to implement regulation or organize production, and how to finance government and its activities"*.

In short, the above approaches recall to the argument that urban services and policy measures are more effectively provisioned when all sectors of society (state and non-state, local and non-local) are involved in the process of policy-making and service provision. This involvement is done either by complementing each other roles or, whenever opportune, over taking responsibilities in particular policy areas. Within this consideration, coordination mechanisms promoting EPI, conceptualized in section 3.2 as "*multi-scale, multi-sector and multi-actor tools, strategies and procedures that promote the adoption of i) environmental considerations and ii) of cross-sector trade-offs (or externalities) in policy making and service provision*" stand for a governance context whose responsibility for policy making and service provision is distributed across the society domains. Hence, the research hypothesises that a higher adoption of coordination mechanisms will trigger more environmentally friendly policies, measured in terms of a) levels of adoption and b) levels of environmental effectiveness.

Research Hypothesis 1

Based on previous research findings, this research hypothesises that more polycentric forms of environmental governance, which are represented by the multi-scale, multi-sector and multi-actor tools coordination mechanisms promoting EPI, will trigger a higher adoption and effectiveness of environmentally friendly policies.

3.4.2 Factors explaining the adoption of coordination mechanisms for EPI

But what stands behind the adoption of the coordination mechanisms for EPI at the urban level? Who should take the first step in setting up these mechanisms? Will the

adoption be voluntarily, or are external enabler factors necessary? These are some questions that the research also aims to explore. In order to hypothesise an answer, one needs first to further explore literature on the enablers of local initiatives for environmental governance.

Previous research on local collective action, whose concept is similar to polycentrism, as it recalls to a common oriented action from all actors of society, highlights two major causal mechanisms for the emergence of environmental governance initiatives at the local level: the transactions costs associated with collaboration and the nature of the goods/problems under negotiation (Ostrom 1995, 2005, McGinnis 2005, Feiock 2008, Andersson & Ostrom 2008, Feiock, Steinacker & Park 2009, Hawkins 2010, Feiock et al 2010, Kwon & Feiock 2010, Hawkins & Andrew 2011, Hawkins & Feiock 2011). Transaction costs represent the costs of setting up and maintaining a collective action framework (McGinnis 2005, Feiock 2008). The propensity for collective action lowers as the costs-benefit ratio increases and as the distribution of costs and benefits among the actors involved gets more uneven. The propensity for collaboration is, in turn, shaped by the type of good (e.g. carbon sequestration, whose benefits are globally dispersed and costs locally concentrated vs. local natural resource management, whose benefits and costs are mainly concentrated locally), local rules and institutional conditions in place, such as monitoring schemes, incentives, collaboration rules and procedures (for a general overview of the institutional pre-conditions for collective action read Ostrom 1990, 2005). Although studies have shown that local actors are able to solely craft the rules and institutional conditions for effectively managing local common good resources, they may need to rely on the help of external actors (e.g. regional/national governments or international NGOs) in particular conditions (McGinnis 2005, Andersson & Ostrom 2008, Hawkins 2010, Ostrom 2010). For example, local government and other actors may lack resources to set up institutional collective frameworks entirely on their own, or the benefits of setting up these schemes may largely favour exogenous actors (externalities), which hinder optimum local levels of collaborative action[4]. In addition, fully decentralized governance systems may be undermined by conflicts, high political costs, lack of leadership, or by local tyrannies (Andersson & Ostrom 2008, p.75).

Although theories of collective action might have arisen within common pool resources, they are not solely confined to these types of goods. Within metropolitan public services, there are also evidences that constitutional-level rules provide incentives or constraints for vertical and horizontal intergovernmental cooperation over fragmented issues (Feiock, Steinacker & Park 2009, Hawkins & Feiock 2011). These rules are especially relevant for public elected authorities, which are oriented towards short-term goals, and thus perceive the process of collaboration as a redundant procedure that should be avoided (Hawkins 2010, Feiock et al 2010, Kwon & Feiock 2010). This is because local collective action yields many costs in the short run, whereas its benefits only start to appear in the mid-long run. The same evidence is found within local policies favouring environmental protection. Andersson and Ostrom (2008) defended that local governmental executives will only favour environmental governance when they have clear incentives to do so, as local

[4] Consider the example of a tropical forest which is shared by 3 countries. From the local perspective of the three countries, if the world wide carbon sequestration services are not remunerated accordingly then incentives to provide this service will be under optimum levels, as they can still allocate forest areas to alternative services (e.g. cattle or timber) while maintaining a sufficient provision of the carbon sequestration service to meet local demands.

environmental protection is generally associated with considerable conservation costs and its benefits tend to be widely dispersed.

From the above considerations, one can conclude that the emergence of coordination mechanisms promoting EPI at the local level may be the result of several factors. Some of these are in control of local actors (like legitimacy and leadership for environmental governance), while others are more contextual-dependent (depending on the typology of the good, the available economical resources, power relationships, interests in stake, existence of national binding requirements).

Being this the case, the research hypothesises that the adoption of coordination mechanisms promoting EPI at the local level is very much dependent on contextual factors:

a) Although local governments have positive incentives in allocating services to private parties, as private sector provision generally occurs at lower costs than public provision, the benefits become more uncertain when pulling private parties to higher environmental compliance by, as an example, introducing minimum environmental criteria as an awarding criteria for subcontracting services to private parties, or adding/increasing taxation on environmental pollution. Local governments might be subjected to pressure from private groups, for instance, with threats of displacing their production elsewhere (as it was the case of Bayer, who threated to relocate its production to countries with lower energy costs, shortly after Germany government announced the nuclear shut down by 2022[5]).

b) Pressure against environmental protection can also emerge from the civil society when, for example, higher environmental compliance increases the price of public services, or when basic public services (such as transportation, employment, infrastructures, social care) are not to sufficiently provisioned. Hence, sector-specific goals and impacts are more prioritized than environmental ones. On the other hand, civil society and consumer's environmental values and awareness may not be strong enough for actors to a) voluntarily adopt environmental management systems and b) establish civil society consultation procedures, given the extra costs and amount of time associated with both.

c) Intra-governmental coordination mechanisms face adoption barriers as well. Moving from departmentalization to more integrative policy making increases local budget needs, associated with the costs of establishing communication channels, training staff, establishing new appraisal procedures, etc. Some studies (ECMT 2001, May & Marsden 2010) defend that financial incentives and minimal compulsory guidelines provided by higher levels of governance are necessary for a more predisposition towards environmental governance by local governments[6]. Integrative intergovernmental structures for EPI are associated with high budgetary costs. In the short run, the increase of revenues is only feasible *via* a rise of local taxes or consumer final prices. However, as stated above, a rise in taxes/prices is likely to reduce government's legitimacy and, hence, government's willingness to adopt the coordination mechanisms for EPI to a greater extent.

d) Finally, an uneven distribution of costs and benefits associated with environmental protection (as it is the case of tropical forest maintenance), the amount of local resources (both financial and knowledge) and the priorities and preferences of development for local actors (e.g. socio-economical priorities may overcome environmental ones, in cases of

[5] "Bayer threatens to quit Germany over nuclear shutdown" Retrieved April 23rd, from http://www.guardian.co.uk/world/2011/aug/07/bayer-quit-germany-nuclear-shutdown

[6] In Netherlands financial packages are provided by national governments to local governments if they chose to follow the minimal guidelines of national transport plans (ECMT 2001, p. 31). Other authors have stated that "*national governments should devolve to regional and local governments those decisions which are best made at those levels, and provide the responsibilities, financial support, knowledge and encouragement to enable those decisions to be made*" (May & Marsden 2010, p.31)

economical crises or for urban areas with low levels of economic and social development) are the remaining factors that determine the adoption of coordination mechanisms for EPI by local actors. Figure 3.4.2 outlines the contextual factors influencing the adoption of coordination mechanisms for EPI by local actors. These are divided in endogenous factors, more specifically the governance characteristic of coordination mechanisms (national binding requirement, voluntarily or mix); and in exogenous factors.

Figure 3.4.2 – Contextual factors promoting the adoption of coordination mechanism for EPI by local actors

Category	Factor	Description
Endogenous factors	- Governance characteristic of coordination mechanisms	The adoption of coordination mechanisms by local actors can either be a national requirement or not.
Exogenous factors	- Legitimacy and leadership	Proper leadership is required to ensure that CMEPI are adopted and effectively conducted by all actors involved in the process of policy making
	- Knowledge and competencies	Professional experience and competencies on coordination mechanisms for EPI influences their identification and design.
	- Financial resources	Coordination mechanisms promoting EPI increases the budget needs for local actors.
	- Characteristics of the good/service	The way costs and benefits of environmental protection are structured determines local agents' incentives to adopt coordination mechanisms for EPI.
	- Social-economical context	Environmental and sector-specific prioritizations are time and context dependent. For example, in weaker socio-economical contexts, sector-specific goals are likely to be more prioritized than environmental ones.

Source: drawn from several authors (Ostrom 1995, 2005, McGinnis 2005, Feiock 2008, Andersson & Ostrom 2008, Feiock, Steinacker & Park 2009, Hawkins 2010, Feiock et al 2010, Kwon & Feiock 2010, Hawkins & Andrew 2011, Hawkins & Feiock 2011).

Altogether, local environmental governance, measured in terms of the adoption of coordination mechanisms for EPI, does not represent an institutional recipe likely to be applied evenly across regions. Contextual factors determine their existence and implementation. Hence, it is now imperative to formulate the second hypothesis of this research:

Research Hypothesis 2

Based on previous research findings, this research hypothesises that contextual factors exert high influence on the adoption of coordination mechanisms promoting EPI by local actors.

Operationalization of EPI in urban passenger transport sector

This section specifies the conceptual modal and research hypotheses, presented in the previous sections, for urban passenger transport sector. Firstly, considerations of EPI in urban transport sector are presented (3.5). Following it, coordination mechanisms promoting EPI and environmentally friendlier policies are specified (sections 3.6 and 3.7 respectively). Section 3.8 deals with the operationalization of the research hypotheses and the final section (3.9) exposes the methodology adopted for testing the hypotheses.

3.5 EPI in urban transport sector

Urban transport policy is considered as the process of regulating and provisioning passenger and cargo transport, including its infrastructures, by governmental authorities and other policy actors within highly populated areas[7] (Tolley & Turton 1995). It too has been prescribed to develop more integrated forms of policy making. This was the case of the 2002 European Conference of Ministers of Transport, which mentioned that "*sustainability requires that policy-making for urban travel be viewed in a holistic sense: that planning for transport, land-use and the environment no longer be undertaken in isolation one from the other; that policies targeting particular transport system elements and modes be considered as an ensemble, their relative impacts determining the "right" policy combination for the sustainable policy package*" (ECMT 2002, p. 33), or the 2009 European Commission Action Plan on Urban Mobility, which states that "*an integrated approach is not only needed for the development of transport infrastructure and services, but also for policy making to link transport with environment protection, healthy environments, land use planning, housing, social aspects of accessibility and mobility as well as industrial policy*" (EC 2009, p. 4)[8].

A urban area can be depicted as a territorial place where a range of actors and policies interact collectively in the pursuit of their goals, which, under certain occasions, are found mutually competitive or conflictive (Simeonova & Valk 2009). A typical example is the relationship between land-use and urban transport. An uncoordinated land-use and transport planning may lead to a decision of licensing urban settlements in areas where transport provision yields higher economic and environmental costs, over alternative settlement areas. Another example is the establishment of an expansionary fiscal policy, aimed at boosting consumption and economic growth, which may trigger, as a side effect, car acquisition and its preference as a travel mode in detriment of more environmental friendly modes. In this case, counter-side effect policies, like car congestion restrictions or car-pooling schemes, are required to revoke the environmental externalities and unintended effects caused by non-transport sector policies on environmental and transportation goals.

[7] Reminder: For the scope of this research, "*highly populated density region*" is a region with more than 80.000 inhabitants and density above 800 inhabitants/Km^2

[8] For an overview of the history of documents referring to EPI into urban transport policy please refer to Geerlings and Sluis-van Meijeren (2008) and to Simeonova and Valk (2009)

Urban passenger transport policy trade-offs are not entirely confined to environmental dimensions, but also to economic and social ones. It is now well acknowledged that a good provision of transport uplifts social problems, including marginalization, exclusion and criminality, also raising employment and education (Power & William Julius 2000, Barton 2009). As such, it is fundamental that urban passenger transport policy making is carried out in means of depicting and assessing its entire impacts to ensure coherence over goals[9].

Despite the increasing support for EPI in urban transport sector, there are still challenges to its full achievement. These are, in part, related to the fragmented policy context, briefly exposed in in chapter 3.1, for which coordination mechanisms are required to wider the adoption of environmental concerns by all actors, and to ensure consistency of transport policies. Other factors relate to external or contextual factors, as exposed in chapter 3.4, which affect both the adoption of environmental friendly policies and the coordination mechanisms promoting EPI. The next box presents some challenges to EPI in urban transport sector.

3.5.1 Challenges to EPI in urban transport policies: some examples[10]

"Governing Metropolitan Lisbon: A tale of fragmented urban governance"

A case study of Lisbon metropolitan governance's structure by Silva (2002) concluded on an improper intergovernmental and inter-tier coordination between municipalities as the main cause of sub-optimal provision of services at the wider metropolitan level. This was the case as municipalities were entirely focused on optimizing their services within their jurisdictions. Explanatory factors of services inefficiencies at the metropolitan level addressed the inability of the associative metropolitan model, a legal non-recognized metropolitan governance system maintained by voluntary municipality actions, to promote satisfactory levels of synergies and cooperation between municipality in policy making and services provision. As mentioned by the author, "*the governance system depends on a system of voluntary interorganisational co-operation involving various bodies having different geographical extent, having severe problems of political and technical co-ordination, and involving complex urban decision-making processes, all of which constitutes a rather chaotic administrative geography, full of duplication and confusion"* (p. 29). As a consequence, the governance system was unable to effectively coordinate the management of transport policies (especially road, public transport provision and traffic management) with the land-use ones, across municipalities (i.e. within metropolitan areas), which hamper the ability to prompt forward a compact and integrated metropolitan service development during the period of analysis. Recommendations to boost coordination and improve the governance model mainly pointed to: a) increasing the political leadership and resources to further enhance an associative governance model; b) setting up a formal two-tier governance structure, with legal and formal competencies across municipality levels; and c) establishing stakeholder cooperation initiatives across municipalities for the most important areas.

[9] However, for the aim of this research, EPI in urban transport sector is studied only at the interactions between transport sector and the environment.

[10] Further examples on the relevance of coordination mechanisms for EPI in urban transport sector can be found on Hull (2005) Viegas (2005), English and Spear (2009), European Commission Directorate General Transport (1996), and European Commission (2000)

As a final remark, although the formalization of a two-tier governance structure at the metropolitan area was initially though as a solution and presented by the opposition government parties, it has not been accepted to date, given the lack of political will and the complexity of the problem, which recalls for a long-term adaptation of the current governance structure. In the words of the author, "*the alternative model of a two-tier system, considered in several political proposals submitted to the national Parliament, although having the strengths of the existing structure but few of its weaknesses, has been politically unacceptable as it is seen as a threat to other levels of government (...)"* (p. 29)

Policy integration: What will it take to achieve more sustainable transport solutions in cities?

A comparative review on the mechanisms for sustainable transport systems in five England cities conducted by Angela Hull (2008), draws attention to the fragmented and conflictive characteristics of local transport policy. It was concluded that although the collaboration of all sectors' policy actors is required to implement sustainable transport policies, the responsibility is mainly falling "*on the shoulders of local transport authorities*"(p. 101). The study also highlights the conflictive organizational aspects and cultures of certain departments, and the lack of effective tools and monitoring mechanisms, as challenges to the development of sustainable transport policies in the short-run. As major recommendations, the study highlights an overall commitment and responsibility of all sectors of society to speed up the adoption of more sustainable transport policies: "*the clear transferable conclusion from this research is that the paradigm of sustainability needs to be shared (implemented and enforced) by all public sector actors if a step-change in the delivery of sustainable transport outcomes is to be achieved. Once this paradigm is clearly defined and accepted, institutional rules can be devised that make the alternatives to the car more attractive.*" (p. 102)

3.6 Coordination mechanisms promoting EPI (CMEPI) in urban passenger transport sector

This chapter highlights the CMEPI found in the literature[11], which are framed by area of integration: governments (3.6.1), markets (3.6.2) and civil Society (3.6.3).

3.6.1 Types of coordination mechanisms for EPI at the government level

3.6.1.1 Environmental Impact Assessment (EIA)

EIA is "*an analytical process that systematically examines the possible environmental consequences of the implementation of projects, programmes and policies*" (OECD, Glossary of Statistical Terms, retrieved from http://stats.oecd.org/glossary/detail.asp?ID=828). Therefore, EIA constitutes a *tool mechanism* to assess ex-ante and ex-post impacts of

[11] The literature mainly surveyed for this section consists of: Expert Group on the Urban Environment 1996, OECD 1996, 2001a, 2001b, Peters 1998, Cabinet Office 2000, Hooghe & Marks, 2003, Jacob & Volkery 2003, Lafferty & Hovden 2003, Jordan, Worzel & Zito 2003, Tews, Busch & Jorgens 2003, Persson 2004, EEA 2005, 2011, ECMT 2006, Lemos & Agrawal 2006, Forrester & Snell 2007, Jordan & Russel 2007, Herodes, Adelle & Pallemaerts 2007, Lenschow 2007, Hull 2008, Nykvist 2008, OECD 2008, 2011, UNECE 2008, and ESDN 2009.

policies and projects with the aim of minimizing negative environmental consequences. Within urban transport policies, EIA can be employed, for example, to assess the environmental impacts of transport infrastructures, like noise nuisances or loss of biodiversity, and potentially alter the infrastructure design or even its implementation as a condition to meet environmental goals. In this regard, EIA represents a coordination mechanism for EPI by performing an ex-ante environmental assessment of urban transport policies. Within the EU zone, the directive Council Directive 85/337/EEC[12] regulates the use of EIA within member states. Whereas EIA is mandatory for transport infrastructure projects such as railways and motorways, it might not be so for other projects, depending on specific criteria such as size, impact and location. In this case, each member state is responsible for defining if its employment is voluntarily or compulsory. In addition, although EIA can potentially promote the development of more environmentally friendly policies, several studies have concluded that this is not always the case. In fact, environmental impacts are not unusually measured accurately and consistently, while EIA is a very sector specific tool, inadequate for assessing cross-sector impacts (Jordan & Russel 2007, Partidário 2010, EEA 2011).

3.6.1.2 Strategic Environmental Assessment (SEA)

Like EIA, SEA represents a coordination tool to *"ensure the full consideration in advance of the specifically environmental impacts of plans, programmes (and less frequently, policies) in order to ensure that environmental considerations are, as far as possible, reconciled with other social and economic objectives*" (EEA 2005, p. 23). SEA gained preference over EIA as a more effective assessment tool of complex urban policies, with the acknowledgment that project impacts and trade-offs are not solely confined to the environment but also to the social and economic dimensions. Whereas EIA represents a standard sequence of activities to assess policies, SEA is a dynamic tool that assists the designing of strategic plans and programmes (consisting of several policies and actions), which favour the overarching goals of the stakeholder and involved sectors (Colantonio 2008, Partidário 2010). In this regard, SEA is also a process of bringing actors together, in order to agree on common goals and planning options: "*Increasingly, SEA major key role can be argued to be that of facilitating decision-making by involving key actors, enabling dialogues towards mutual understanding, ensuring a long-term and large scale perspectives when considering development options*" (ibid. p.527). SEA can also be seen as a tool to tune and adjust environmental and related goals (e.g. housing environment and transport) by means of designing and assessing integrative planning packages and strategies. Within EU zone, the directive 2001/42/EC[13] regulates SEA, whose application is compulsory under certain types of programmes and plans.

Although SEA embodies a step forward towards sustainability, in the sense that it represents an overarching assessment tool, it still faces a range of challenges, similarly to EIA: the use of different SEA approaches (and other related assessment tools) which brings inconsistency to the way SEA is designed and conducted; few evidences for assessments

[12] Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment, Retrieved January 15, 2012 from: http://eur-lex.europa.eu/smartapi/cgi/sga_doc?smartapi!celexplus!prod!DocNumber&lg=en&type_doc=Directive&an_doc=1985&nu_doc=337

[13] Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment, Retrieved January 15, 2012 from: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32001L0042:EN:NOT

being conducted to alter plans and strategies, which minimizes the capacity to influence programmes design before their implementation stage; and lack of data to completely assess all programme impacts (Herrera 2010, EEA 2011). In addition, there is no accepted measurement unit to compare the trade-offs between different impact dimensions (e.g. economical vs. environment) (Pisani & Sandham 2006, Colantonio 2008). Thus, the ability of SEA to influence decision-making depends on the defined priorities, objectives and weighting criteria used in policy appraisal, which are likely to vary across sectors, regions and governments.

3.6.1.3 Local plans and strategies to improve the environmental performance of urban passenger transport systems

Environmental Plans represent a cross-scale and cross-actors planning strategy, whose outcome, subject to reporting and evaluation requirements, consists of priorities, goals and policies to be pursued by governmental actors across all administrative level (Jacob & Volkery 2003). These plans can be formulated both at the national level (e.g. an overall sustainable strategy for a country), and at the local level (e.g. a local environmental strategy), and generally combine strategies to harmonize the trade-offs between two or more dimensions (e.g. transport housing and environment strategy, or transport and social strategy) (ECMT 2001, ESDN 2009).

An example of these plans is the Sustainable Urban Transport Plans (SUTP), which has become widely supported by EU as a policy and planning mechanism for more effective and consistent urban transport policies (Environment DG 2005, COM/2005/0718[14]). As a process, SUTP involves the participation of stakeholders and comprises several phases: preparation; assessment of business-as-usual scenario; definition of goals and objectives; impact assessment of strategies and policies; definition of strategies; allocation of responsibilities; and monitoring and reporting (for more information please refer to EC 2007, p. 12). In this regard, SUTP stands for a vertical and horizontal coordination tool. As an output, SUTP addresses a mix of supportive measures and strategies to achieve the goals initially set up by the integrated strategy upon which they were formulated.

The main relationship between environmental plans and the impact assessments described before, EIA and SEA, is the following: a) SEA and EIA can be used as stand-alone procedures, independent from integrative process strategies; b) SEA and EIA ***should*** support the formulation of SUTP, as tools to outline the best strategies that meet the overarching goals for a urban settlement (formulating transport plans without any form of ex-ante assessment, either environmental or strategic, is unlikely to validate the selected package of measures as the best one to fulfil the overarching stakeholders' goals).

3.6.1.4 Mechanisms and strategies to increase the vertical integration of transport policies

Vertical integration of urban transport policies plays a central role for more environmentally friendly transport policies (OECD 2001a, 2001b, ECMT 2001, 2002, 2006, Nykvist 2008, UNECE 2008). It is now acknowledged that neither full decentralization nor full centralization stands for the best governance strategy (ECMT 2001, 2002, Corfee-Morlot et

[14] Communication from the Commission to the Council and the European Parliament on Thematic Strategy on the Urban Environment {SEC(2006) 16, COM/2005/0718 Retrieved January 17, 2012 from: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52005DC0718:EN:NOT

al 2009). At the same time, the national government should engage with regional and local governments to collaboratively agree on their responsibilities, roles and goals in transport planning, but they should also regularly monitor regional and local governance performance. In turn, regional and local governments should be able to influence their responsibilities and goals, to reflect local constraints and particularities, and request national or regional collaboration for problems whose solution is not effectively managed solely by lower administrative tiers (ECMT 2002, Corfee-Morlot et al 2009).

Strategies promoting vertical coordination of policies consist, for example, of formalized and non-formalized regular discussions forums and reporting channels among different administrative levels. These mechanisms, also named by some authors as communication tools to EPI (Simeonova & Valk 2009), mitigate the communication disabilities of disruptive vertical departments involved in policy making, especially for cases where two set of policies are implemented at different vertical layers of government, and build "consensus" across policy departments with conflictive or complementary policies.

Whereas environmental plans represent an overarching strategy for EPI, which include vertical and horizontal coordination mechanisms considerations, mechanisms to increase the vertical integration of departments in policy making stand for communication tools and procedures that align the daily action of actors at different scales of government.

3.6.1.5 Mechanisms and strategies to increase the horizontal integration of transport policies

As presented in section 3.5, urban transport policy accounts for externalities (trade-offs) across other sectors of societies. As such, and apart vertical integration, urban transport policies should be formulated in coordination with cross-sector policies, to minimize conflictive externalities and favour more consistent environmental, transport and land-use policies (OECD 2001a,2001b, ECMT 2002, Geerlings & Stead 2003, Stead 2008, ESDN 2009). Strategies to overcome the horizontal departmentalization of independent policy making include, among others: setting-up overarching goals for individual sectors (e.g. transport sector has to meet its transport goals within environmental and land-use parameters); merging public departments whose cross-externalities are more intense (e.g. transport and land-use departments are merged into one single administrative department); and increasing cross-sector communication and partnerships between policy sectors in transport planning (Cabinet Office 2000, Lafferty & Hovden 2003, UNECE 2008, Stead 2008, ESDN 2009, Simeonova & Valk 2009).

Although environmental plans, like SUTP outlined in section 3.6.1.3, include features of horizontal integration, strategies for horizontal integration have a broader application. As in the case of vertical integration mechanisms, horizontal mechanisms recall for how cross-sector departments address common and conflictive interests of policy making on a daily basis, for example, through means of communication and partnerships mechanisms.

3.6.1.6 An independent authority responsible for identifying, steering and managing the cross-cutting issues of environmental, land-use and transport planning

Many authors agree on the need to set up an independent authority responsible for supervising the process of environmental integration in non-environmental sector policies (Jacob & Volkery 2003, Lafferty & Hovden 2003, Stead 2008). This formal administrative entity would be responsible for ensuring that environmental and non-environmental

impacts would be weighted in accordance to the measuring criteria agreed by national or regional authorities (Lafferty & Hovden 2003). In practical terms, this can be the case of a new entity, with some authors referring to "green cabinets" or "interdepartmental working groups" (Jacob & Volkery 2003), or of an existing entity allocated with new tasks in terms of managing the overarching or cross-cutting policy issues. An example of an "independent authority for environmental integration" is the metropolitan air quality group set by the Bristol City Council, which is responsible to manage air quality issues within transport policies (traffic management, planning, and traffic signals). The group was found particularly efficient in early stages of policy making, where it brought together different policy making actors (Beattie, Longhurst & Elsom 2004).

This authority differentiates from the remaining coordination mechanisms for EPI at the government level, as it represents the administrative body responsible for the process of environmental integration, which monitors the compliance of coordination mechanisms with the ones agreed upon initially, and solves up integration divergences and disputes.

3.6.2 Types of coordination mechanisms for EPI at the market level

3.6.2.1 Competitive tendering contracts in public services

Competitive Tendering (CT)[15] is a subcontract awarding procedure that promotes competition between two or more contract proposals by awarding the best cost-efficient offer (ICLEI 2003). Econometrical studies suggest that CT is, in general, associated with lower costs and higher efficiencies in the provision of public services. In public transport services, CT was found to be responsible for an increase of passengers and a reduction in operational costs (ICLEI 2003, Bekken et al 2006).

The relevance of CT, as a coordination mechanism for EPI, is its ability in awarding a public service contract to entities that best meet the requirements stipulated on the contracts. Although these requirements may not necessarily address environmental performance indicators, CT represents a good procedure to effectively and efficiently subcontract services to third parties.

3.6.3 Types of coordination mechanisms for EPI at the civil society level

3.6.3.1 Citizen communication instruments for public participation in transport planning

Public participation in policy making is often considered essential for integrative policy making (OECD 2001a, 2001b, 2002, Transplus 2000, ECMT 2006, Jouve 2008). On one hand, the management of cross-sector and cross-policy issues and trade-offs implies the discussion of alternative policies options closely linked with civil society representatives, to better fit their preferences and expectations during the design and implementation phases

[15] Within EU countries, CT in road transport is regulated by Regulation No 1017/68 - Council Regulation (EC) No 169/2009, which sets the conditions for CT compulsory use and awarding procedures. Available on http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32009R0169:EN:NOT

of policies. On the other hand, public participation can enhance political legitimacy and mutual consent over policies that, *a priori*, face public or political obstruction (OECD 2001b, 2002, ECMT 2006). The relevance of public participation for EPI relies on its ability to discipline the authority of state and state-monopolistic behaviour, and promote pluralistic forms of governing (Stoker 1998). Thus, public participation fits into an institutional design that best promotes sustainable development policies, if one sees sustainable development as ultimately associated with an interactive process of choosing the best strategy to solve the problems faced by societies. As such, even the process of setting the weights for policy appraisal, between environmental and non-environmental aspects, should ideally be conducted inclusive of civil society representatives.

In practical terms, civil society coordination mechanisms for EPI consist of institutionalized or informal ad-hoc consultation procedures between policy actors and civil society representatives (see for example Transplus 2000, p.32). These mechanisms stand for partnership and consultations procedures between public/private policy actors and environmental experts/NGOs, which advance knowledge and strategies for environmental protection (OECD 2001a, 2001b).

Table 3.6.4, summarizes the coordination mechanisms promoting EPI in urban passenger transport sector. The ones underlined and highlighted in green stand for ***voluntary*** mechanisms and strategies that are not subject to minimal compulsory requirements from EU or National governments. For example, as opposed to EIA and SEA, Sustainable Urban Transport Plan, although widely supported by EU, has not evolved into binding requirements: "*given the diversity of urban areas and existing national, regional and local obligations, and the difficulties linked to establishing common standards on all urban environment issues, it was decided that legislation would not be the best way to achieve the objectives of this Strategy. Most Member States and local authorities supported this approach, questioning the need for binding EU obligations on environmental management and urban transport plans"* (COM/2005/0718[16]). In this regard, these mechanisms, hereafter named as green voluntarily coordination mechanisms for EPI, are purposely distinguished in hoping to shed some conclusions on the extent to which local actors go beyond the expected minimal requirements for environmental protection.

Table 3.6.4 - Overview of Coordination Mechanisms Promoting EPI (CMEPI) in urban passenger transport sector

1. Coordination mechanisms to EPI at the Government level
   - 3.1 Environmental Impact Assessment (EIA)
   - 3.2 Strategic Environmental Assessment (SEA)
   - 3.3 Local plans and strategies to improve the environmental performance of urban passenger transport systems
   - 3.4 A local Sustainable Urban Transport Plan (SUTP), in accordance with the designing principles provided by the European Commission's Thematic Strategy on the Urban Environment
   - 3.5 Mechanisms and strategies to increase the vertical integration of transport policies

[16] Communication from the Commission to the Council and the European Parliament on Thematic Strategy on the Urban Environment {SEC(2006) 16, COM/2005/0718 Retrieved January 17, 2012 from: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52005DC0718:EN:NOT

3.6 Mechanisms and strategies to increase the horizontal integration of transport policies
3.7 Strategies to increase public authorities skills in environmental, land-use and transport integrative planning (e.g. joining city networks, promoting job rotation among departments, conducting workshops, joining expertise urban planners networks)
3.8 The existence of a shared budget for integrative transport planning.
3.9 An independent authority responsible for identifying, steering and managing the cross-cutting issues of environmental, land-use and transport planning

2. Coordination mechanisms to EPI at the Market level
   3.1 Competitive tendering contracts in public services
   3.2 The usage of Environmental performance indicators when awarding a transport service to a subcontractor

3. Coordination mechanisms to EPI at the Civil Society level
   3.1 Citizen communication instruments for public participation in transport planning
   3.2 The existence of NGOs or civil society groups collaborating with local governments for transportation planning
   3.3 The existence of a voluntary environmental compliance agreements, label or code of conduct adopted by public transport operators

3.6.5 Good examples of coordination mechanisms for EPI in urban transport sector

The Dutch experience

An in-depth analysis of urban transport planning in The Netherlands concluded that their policies were "*the product of an integrated, iterative process involving input from transport, environment and land use institutions on the central, provincial, regional and municipal levels of government*" (ECMT 2001, p. 27). The organization of transport planning in the Netherlands was organized under three governance layers, in which each level had a clear division of roles and responsibilities for policy making and service provision. Whereas national governance exerted strong guidance in policy making over subsequent levels of governance, with the aim of ensuring national wide consistency of goals and priorities, doors were not closed to regional and municipality policy initiatives. Regional and local governments were allocated with responsibilities on topics whose policy making and implementation yielded more benefits for those intermediary and local levels. For example, whereas national government was mainly responsible for transport infrastructures provision and land-use planning, local municipalities were allocated with responsibilities over transport policy making (e.g. parking policy, cycling and public transport provision), and regional governments were in charge of coordinating inter-municipalities transport policies. The division of tasks among the layer of governance was chosen to maximize the trade-offs between the involved transactions costs[17] and the amount of coordination achieved[18] in policy making and service provision.

[17] Transactions costs are defined by OECD as "*the costs involved in market exchange. These include the costs of discovering market prices and the costs of writing and enforcing contracts. (…)Transaction-cost analysis has*

The process of policy making was found to be participative, along the three tiers, and integrative, including considerations from other sectors, whose outcome consisted of an urban transport plan containing the major prioritizations and both transport and non-transport goals. Vertical coordination was realized by a formal consultation procedure between representatives of the three tier levels of government. To this end, national objectives were agreed in mutual consultation, latter integrated into each administrative layer, which subsequently led to formulation of administrative contracts and implementation plans. The incentives to implement these plans are always managed by central authorities and, in some instances, through financial implementation incentives. Although there is no binding implementation requirement, national authorities can place a veto on a regional or local transport plan, in case it falls outside the national guidelines defined on national transport plans. On the other hand, horizontal coordination was achieved at a first step by inter-ministerial consultation, to reflect upon conflictive goals and to set common prioritizations and objectives to each sector. After this consultation, national guidelines were defined for each sector, with the aim of ensuring national wide attainment of priorities and goals. Regions and municipalities then work together on the elaboration of their regional and local plan, within the defined national guidelines, which undergoes a consultation process with transport related sectors and civil society representatives. These plans pass through specific approval procedures to ensure compliance with the wide-national agreed goals and priorities.

Cities, Climate Change and Multilevel Governance

An analysis on the multilevel governance system of several cities and metropolitan areas by Corfee-Morlot *et al* (2009) draws interesting conclusions on the best practices for sustainable urban policies. The research concluded on the existence of three governance systems: a) "*nationally led or top-down"* approaches, in which sustainable policies frameworks are mainly imposed and steered by national governments on local governments; b) "*locally led or bottom-up*" approaches, where national levels "respect" local governments self-initiated and successful sustainable planning experiences; and c) "*hybrid*" approaches, in which cities and metropolitan areas yield features of both governance systems. Evidences show that the mix governance system is the most promising, as it combines the deficiencies of one system with the features of the other. National policies can pull local actions towards more environmental policy integration and, at the same time, provide policy coordination supervision over issues spamming wider regions. On the other hand, acknowledging the fact that national policies can also constraint the ability of local layers towards sustainable actions, local arenas should be the place of experience of innovative *ad hoc* and pilot projects, which, if successful, should gain national application and support.

been used to explain vertical integration, multinational enterprises, and franchising." (in OECD – Glossary of Statistical Terms, retrieved from http://stats.oecd.org/glossary/detail.asp?ID=3324).

[18] Nonetheless urban transport policies are more effectively when formulated and implemented at lower scales of governance, once policy making is more participative and interactive and thus more representatives of the citizens' preferences, its coordination over metropolitan areas, i.e. between municipalities, might be undergone more effectively by a regional 2nd tier organization (Corfee-Morlot et al, 2009). At a local level the added benefits of coordinating metropolitan transport policies deducted from the transaction costs of coordinating a higher number of actors in policy making, may not surpass the ones when coordination is of a regional body responsibility.

The paper also points out to the importance of regional 2nd tier governance systems to coordinate municipality services[13]: "*Regional, as opposed to municipal, approaches to climate change mitigation and adaptation can, due to their scale, accomplish structural changes that would not be possible at the city level. (…) Regions can also develop strategies to link policies and programmes that would otherwise operate in isolation, e.g. connecting initiatives between urban and rural areas or across multiple adjacent municipal authorities. (…) regional collaboration can achieve mitigation and adaptation targets more efficiently than if municipalities were to act individually.*" (p. 12)

3.7 Environmentally friendly urban passenger transport measures

EPI at the output level, which the research labels as *Environmentally Friendlier Urban Passenger Transport Measures (EFUPTM),* follows the same definition of environmental friendly policies presented in section 3.3. Hence, EFUPTM stands for measures that meet urban passenger transport goals within minimized or accepted levels of environmental degradation, either by choosing a variance of policy that minimizes the environmental impact or by a combination of measures that together minimize their overall negative externalities. More specifically, within this research, EFUPTM is related to measures that: a) promote a modal shift from car to non-car travel modes (e.g. improvement of Public Transport network, accessibility, and safety of public transportation, cycling and walking modes of travel); b) reduce the environmental effects of certain urban travel modes (e.g. traffic calming and subsidizing the purchase of greener vehicles); and c) reduce the need for urban travel, at least to a certain extent (e.g. a concentrated land-use and transport oriented development of urban settlements) - Of note, measures that increase the on-line provision of urban services (e.g on-line shopping, on-line working, and e-learning) and reduce the need for urban travel were not considered by this research.

Hence, EFUPTM stand for mutually supportive and less contradictory policy measures, which account for greater environmental outcomes while meeting transport goals (May & Roberts 1995, Lautso et al 2004, Environment DG 2005, May, Kelly & Shepherd 2006, Gärling & Schuitema 2007, Santos, Behrendt & Teytelboym 2010).

The need for a package of policies accounting for more environmentally friendly outcomes in the transport sector takes into consideration two important aspects. The first is the overarching goals that public transport systems should strive for. A study by the European Conference of Ministers of Transport, ECMT 2006, points out to 9 goals: "*improving transport safety; creating wealth; improving access; reducing congestion; reducing severance, fear and intimidation; protecting ecology; reducing noise; reducing greenhouse gas emissions; and improving air quality"* (in ECMT 2006). As a consequence of the overarching goals, a set of overarching policies are needed, as no single policy is able to entirely satisfy the overall goals. The second aspect relates with the trade-offs that policies yield. For example, a policy aimed at improving accessibility may as well, as a side effect, increase greenhouse emissions and reduce road safety (May & Roberts 1995, TRL 2004, May, Kelly & Shepherd 2006, Gärling & Schuitema 2007, Vieira, Moura & Viegas 2007, OPTIC 2011a). Tables 3.7.1 and 3.7.2 outlines these two considerations.

Table 3.7.1 Impact of individual transport measures on each transport goal

Objective measure	Efficiency	Environment	Safety	Accessibility	Equity	Finance	Net

Traffic management	√√?	√/x	√√	√/x	√/x	0	√√√
Urban traffic control	√√	√	√	√	0	xx	√√√
Accident remedial	0	0	√√√	0	0	0	√√√
Traffic calming	x	√√/x	√√	x?	√/x	xx	0
Regulatory restrictions	√/?	√√	√√	√√/xx	√/x	x	√
Parking controls	√	√	√√	√/x	√/x	0	√√√√
Car sharing	0	0	0	√	0	0	0
Bus priorities	√√	?	√	√/x	√	0	√√√
HOV lanes	√/?	?	√	√/x	√	0	√
PT service levels	√	√	√	√√	√	xx	√√√
Service management	√√	0	0	√√	√	x	√√
Cycle lanes	0	0	√√	√/x	√	0	√√√
Cycle parking	0	√/x	√/x	√/x	√	0	√
Pedestrian crossing	x	√/x	√	x	√/x	0	√√√√

Legend:

√ √√ √√√	Positive impact
x xx xxx	Negative impact
√/x	Positive and negative impact
?	Uncertain impact
0	No significant impact

Source: TRL 2004, p. 155

Table 3.7.2 Potential synergies between transport policy instruments

Policy instruments			Transport supply instruments						Regulatory instruments				Economic instruments			
	Nº / Description		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Transport supply instruments	(1)	Construction of railways		C					A	A		A	A	A		A
	(2)	Networks of logistic platforms	C		C/E					C	E			E		
	(3)	Alternative fuels for road transportation		C					A	C/A			A	A	A	
	(4)	Information systems to optimize the use of road capacity		C			A			E	E	E	E			E
	(5)	Eco-driving						C				C/A		A		
	(6)	Environmental management in transport companies			C/E	E	C				A					
Regulatory instruments	(7)	Vehicle Emissions Regulation								C/A	C		A	A	A	A
	(8)	Restricted access of freight vehicles to city centres		E	C				C							
	(9)	Reform of IM programs						C	C				E			E
	(10)	Enforcement of lower speed limits	C				C									
Economic instruments	(11)	Circulation taxes based on the vehicle's efficiency	F	F	F	F			C		C				C	
	(12)	EU Fuel tax harmonization	F	F	F	F	C									

	(13)	Differentiation of vehicle acquisition taxes	F		A A A
	(14)	Internalization of external costs in the taxation of transport infrastructure	F F F	C	

Legend:

A - Acceptability	instruments in rows increase the acceptability of those in columns
C - Complementarity	instruments listed in the rows improve the effectiveness of those in columns
E - Enforcement	instruments in rows contribute to the enforcement of those in columns
F - Finance	instruments in rows finance those in columns

Source: Vieira, Moura & Viegas 2007, p. 428

Thus, one of the major challenges to implement sustainable transport measures is the choice of the best combinations of measures that most effectively and efficiently meet the overarching goals of urban transportation.

The list of policy combinations that best promote environmental protection in urban transport sector, and which this research uses as benchmark assessment, is withdrawn from the European Union's *Preparatory Document in relation to the follow-up of the Thematic Strategy on the Urban Environment* (EC 2007, p.13). These policies represent the best supportive policy package for environmental protection, as so proclaimed by the document, and stands for the following policies:

1. Policies promoting integration of land use and transport systems:
   - Regeneration of abandoned or underused city sites (Brownfield land)[19]
   - Urban settlements located around public transport networks

2. Policies promoting modal shift towards public transportation
   - Wider public transport network coverage
   - Integration of public transport modes
   - Park and bus ride facilities
   - Public transport subsidies
   - Dynamic public transport information
   - Real time public transport timetables
   - Passenger-friendly public transport stops (e.g. seats and ceilings in bus stops)
   - E-ticketing systems for public transport
   - Integrated fares for different collective transport modes (tram, bus, metro, train)
   - Public transport priority lanes
   - Public transport mobility services for target users (e.g school and business PT plans)
   - Safety and security measures for public transport (e.g. ensuring safety of bus stops, safe driving behaviour)
   - The existence of car pooling schemes

3. Policies promoting cycling and walking
   - Wider pedestrian network (coverage, safety and quality)

[19] The rehabilitation of empty or inactive urban spaces reduces urban sprawl. As such, urban travel journeys, for work shopping and leisure, are of lower distances.

- Extensive cycling network (coverage, safety, quality, parking facilities)
- Integrative cycling and public transport modes
- Priority traffic measures to pedestrian and cyclists over motorised traffic

4. Environmentally friendly parking policies
   - Parking policy aimed at restricting car travel demand and favouring modal shift (e.g. parking lots outside the inner-city and close to collective transport corridors)
   - Regulation of private parking provision (prices and lots) to promote modal shift and restrict car travel demand
   - Discount parking tariffs for low-emission vehicles or green fleet

5. Urban road pricing policies
   - Urban road pricing schemes
   - The allocation of urban road pricing revenues to finance the improvement of modal-shift, or cover the environmental impact and side effects of traffic.

6. Traffic restriction policies
   - Speed limited zones
   - Low emissions traffic zones
   - Car access restriction zones

7. Policies favouring cleaner fuels and vehicles
   - Policies subsidizing cleaner public fleets
   - Measures subsidizing cleaner private vehicles
   - Alternative and green fuels supply (network coverage)
   - The existence of a voluntary environmental compliance agreement, label or code of conduct adopted by public transport operators

These are policy measures that: a) promote a modal shift from car to non-car travel modes; b) reduce the environmental effects of certain urban travel modes; and c) reduce, to a certain extent, the need for urban travel (e.g. policies promoting integration of land use and transport systems)

3.8 Operationalization of the Hypotheses

3.8.1 Research Hypothesis 1 – What promotes the development of more environmentally friendly urban passenger transport policies?

The research hypothesis that a higher adoption of the coordination mechanisms for EPI, outlined in section 3.5, will stand for more environmentally friendly urban passenger transport measures (EFUPTM), measured in terms of effectiveness and ranks of adoption. Whereas CMEPI constitutes the endogenous explanatory factors, chapter 3.4.1 also presented the existence of other factors influencing environmentally friendly policies. These exogenous factors will be next described in more detail, after which the operationalization of the hypothesis is presented.

Many studies have presented the range of barriers for the adoption of EFUPTM (ECMT 2002, TRANSPLUS 2003, Beattie, Longhurst & Elsom 2004, Hull, Tricker & Hills 2006,

Filion & McSpurren 2007, Forrester & Snell 2007, Gärling & Schuitema 2007, Stead 2008, Te Brömmelstroet & Bertolini 2010, OPTIC 2011b). The following categorization constitutes the summary of these studies and a brief summary of each is presented below:

a) Legitimacy: lack of political and stakeholder acceptance of policies
b) Incoherent policy framework: lack of a favourable leadership or coalition
c) Legislative and regulatory: lack of legal supportive basis to adopt or implement measures
d) Funding and financial: lack of resources to finance the establishment of measure
e) Knowledge, information and skills: lack of data, instruments and skills in policy design and appraisal
f) Physical and landscape: lack of a favourable landscape and land-use pattern

These factors mainly affect the adoption of policies that promote modal shift towards car and reduce the environmental impact of certain passenger transport modes. As for external impacts in reducing the need for travel, as already mentioned before, this research only considers the compact city model (in terms of density). However, other factors, such as online provision of urban services (like e-work and e-shopping) are not considered as EFUPTM for the scope of this research. Therefore, only modal share is considered and the total number of trips is left out. Finally, some considerations for the exogenous factors affecting modal share are presented in subheading point g).

a) Legitimacy: lack of political and stakeholder acceptance of policies

EFUPTP stands for a mix of coercive and non-coercive instruments, which might not be easily acceptable by some groups of civil society, especially when the full benefits and costs of policies are not immediately perceived (ECMT 2002, Gärling & Schuitema 2007, Forrester & Snell 2007). For example, car-ownership is generally associated with values of freedom and welfare (Jakobsson, Fujii & Gärling, 2000). Any coercive measures to reduce car use towards other transportation modes might face pressure from groups with higher affinity levels to cars (Transplus 2003, Hull, Tricker & Hills 2006). If car pricing measures are not supplemented with accessibility and quality improvements over other transport modes, then pressures are expected to be even higher. This recalls to the fact that policies should be combined to build synergies and minimize their trade-offs (Gärling & Schuitema 2007, May, Kelly & Shepherd 2006).

At the same time that civil society can be a constraint to the delivery of certain measures, governments can too constitute an obstacle. As seen in section 3.4.2, bureaucrats are in general oriented towards short term goals, given the short period they remain in office and the long term benefits vs. short term costs associated with sustainable transport policies. This condition determines political prioritization to short term benefits over long term prosperous conditions.

b) Incoherent policy framework: lack of a favourable leadership or coalition for EPI

Another factor affecting the adoption of more environmentally transport policies is the political will and leadership (ECMT 2002, TRANSPLUS 2003, Persson 2004, Forrester & Snell 2007). Strategies, procedures and tools for EPI may be adopted by local governments, but their performance may not be carried out in accordance with their good principles. Effective leadership, translated into a regular assessment of performance and recommendations for improvement, are key points to avoid redundancy and advance

innovations in the process of sustainable transport policies delivery. Commitment should come from all departments and individuals involved in the chain of EPI (ECMT 2002).

In addition to leadership, the political cycle also determines the policy output. As seen in section 3.7, transport policy involves a range of goals. The way these goals are prioritized is dependent on the local context, local priorities, external and economical shocks, or new elected government with different policy orientation (TRANSPLUS 2003, ECMT 2002). For example, an industrial city that has yet to further develop its transport infrastructures may, in the short run, prioritize transport development towards economic wealth and accessibility goals rather than environmental protection. On top of these, governments might be faced with the challenge of having to balance competitive interests of different stakeholders, either within the local context or within intra-regional and national layers of government, in the absence of effectively managing rules and techniques to best balance the conflictive interests in stake (Beattie, Longhurst & Elsom 2004, Filion & McSpurren 2007).

c) Legislative and regulatory: lack of legal supportive basis to adopt or implement measures

A clear definition of responsibilities, roles, objectives and procedures is essential for a more effective policy integration process (ECMT 2002, TRANSPLUS, 2003, OPTIC 2011b). These ensure the avoidance of any legal and regulatory disruption in the process of policy formulation. At the same time, they advance coherency and transparency on how policy and consultation processes are carried out and, for example, how appeals and disagreements can be brought for discussion between different parties. In some situations, it was found that the process of decentralization and privatization failed to effectively allocate responsibilities and roles, particularly in the absence of a regulatory agency to whom local authorities or privates' bodies should report to (TRANSPLUS 2003). Apart from these, the legal nature of some policies, like pricing road and congestion, might fall into a jurisdiction which is of no one party responsibility. Thus, a favourable legal and regulatory framework should exist for policy integration, as policy trade-offs might not be the responsibility of any department (Hull, Tricker & Hills 2006)

d) Funding and financial: lack of resources to finance the establishment of measure

Financial constraints represent another barrier to EFUPTP. The changes and processes for EPI (establishing communication channels, assessment tools, plans, training, etc) considerably increase local budget needs (ECMT 2002, Hull, Tricker & Hills 2006). In addition, the policy itself, at the output level, is likely to account for a significant investment on infrastructures (e.g. the provision a tram or metro network). Within local governments, budget is allocated according to the highest rate of return, which is ranked by the most problematic situations and the respective costs involved. Everything equal, an increase on the costs to effectively solve urban transport environmental related problems reduces its priority on the list of governments' actions. On top of these, CMEPI does not stand for a one year increase of the administrative costs. Administrative costs are expected to persist over a long time period and, in case of an uncertain scenario of funds for transport policy, local governments actions towards EPI might be hindered (TRANSPLUS 2003, Hull, Tricker & Hills 2006). Finally, funding barriers can also be the result of an ineffective taxation system which does not address, to a considerable extent, the negative environmental externalities of transport systems (i.e taxes on externalities might not be applied thoroughly, over all

externalities) or, alternatively, the revenue of these taxes are not available to subsidize EFUPTP policies.

e) Knowledge, information and skills: lack of data, instruments and skills in policy design and appraisal

The challenge of bridging and complementing policies from different sectors to minimize trade-offs and gain efficiencies brings alongside two technical assumptions: a) that information on the cross-sectoral trade-offs is available; b) and that policy actors have enough skills and competencies on each others domains to effectively develop and use policy integration instruments. Studies that paid attention on these aspects have claimed that the process of EPI should be followed not only by new policy appraisal instruments and new type of data, but also by an uplift of actors competences in the process of policy appraisal, which are essential to reach consensus over the range of trade-offs and policy options within EFUPTP (ECMT 2002, Stead 2008, Hull, Tricker & Hills 2006, Te Brömmelstroet & Bertolini 2010, OPTIC 2011b).

f) Physical and landscape: lack of a favourable landscape and land-use pattern

The physical context of urban areas affects the delivery of transport policies. The relationship between sustainable modes of travel and urban form is currently well acknowledged (read for example Kenworthy & Laube 1999, Dieleman, Dijst & Burghouwt 2002, Handy 2005). Everything equal, more dispersed urban settlements are likely to be more dependent on car than lower ones, as the benefits of travelling by car, in opposition to other travel modes, are higher (Santos & von Brunn 2011). In the same line of thinking, cities yielding many steep and hilly areas, when compared to flatter territory cities, face higher challenges to shifting modal transport share from car to non-car ones (TRANSPLUS 2003, Hull, Tricker & Hills 2006, Filion & McSpurren 2007). A final challenge potentially faced by local areas is the unavailability of urban space, at least in the short run, to accommodate more environmentally friendly transport policies. Current land-use context of cities is the result of past policies and governments' actions, which might have been totally opposed to the priorities of a more environmentally friendly transport system (TRANSPLUS 2003).

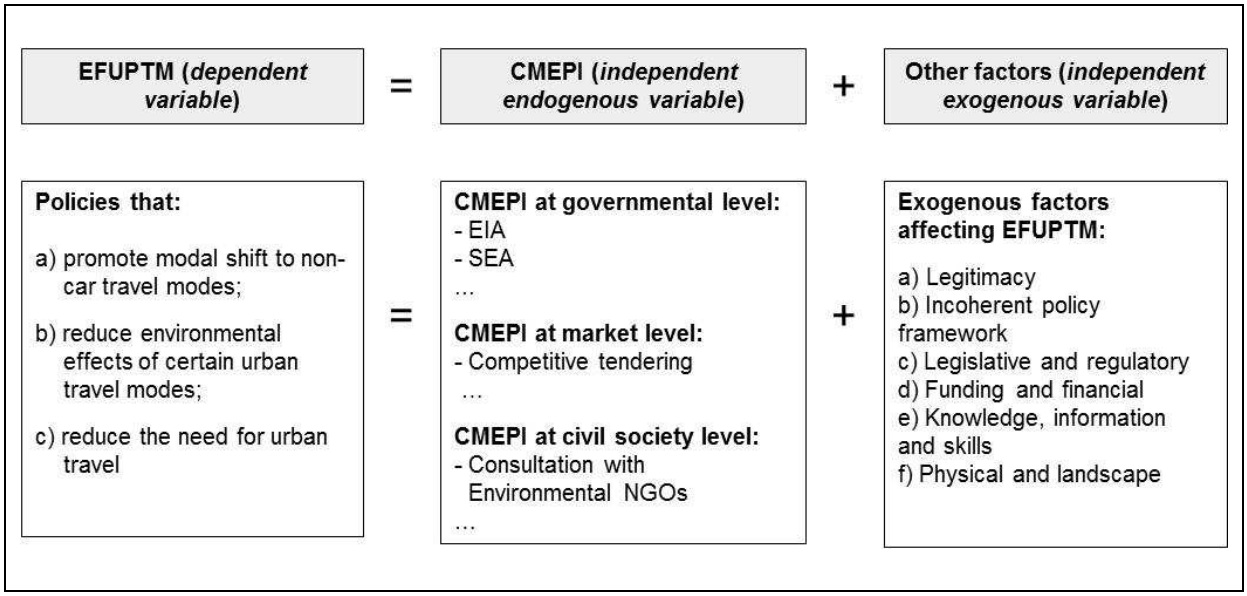
g) Exogenous factors affecting Modal Share

Many authors have conducted econometrical analysis with the aim of underlining the variables that explain urban transport modal share (a good overview is made by Fang Zhao et al. 2002, and Santos & von Brunn 2011). Factors affecting the choice of transport mode are varied and generally categorized under 5 dimensions: quality of service; accessibility; land use and design; socioeconomic and demographic; and purpose of trip (Racca & Ratledge 2004). For this research, it is considered that the quality and accessibility of the PT service are, to a greater extent, covered by the environmentally friendlier package of policies. As for the urban density and socioeconomic demography indicators, the research will consider them as exogenous variables necessary to take into account in case of high disparities between cases. The purpose of the travel will be disregarded by this research due to difficulties to gather data on modal share for different types of journey. The purpose of travel considered as being relevant for study is the home-work-home trip.

The research does not consider the total number of urban trips as a relevant outcome variable, since most factors determining the need for urban travel mainly result from exogenous factors rather than on the existence or not of CMEPI (e.g. the higher urban sprawl, the higher is the need for travel, and the higher the income, the higher is car

ownership, associated with a higher number of trips), or of policies that are not within the scope of the EFUPTM considered by this research (like e-shopping, e-learning or e-working).

Figure 3.8.1 Conceptual model of factors promoting EFUPTM



3.8.1.1 Operationalization of Hypothesis 1 variables

The measurement of the *adoption* of EFUPTM (dependent variable) and of CMEPI (independent variable) is operationalized by means of a likert scale, addressing respondents' perceptions of the extension to which measures/mechanisms are adopted by their cities.

Figure 3.8.1.1a – Ordinal scale employed to measure the extent to which coordination mechanisms to EPI and the package of polices has been adopted by cities.

Scale	Description
0	Non-existent
1	Limitedly adopted
2	Partially adopted
3	Largely adopted

The measurement of the *effectiveness* of EFUPTP (dependent variable) is also operationalized by a likert scale, representing respondents' perceptions of the effectiveness of each type of EFUPTP to advance a more environmentally friendly urban transport sector for their cities.

Figure 3.8.1.1b – Ordinal scale employed to measure the effectiveness of EFUPTM.

Scale	Description
0	Ineffective
1	Low effective
2	Moderately effective
3	Highly effective

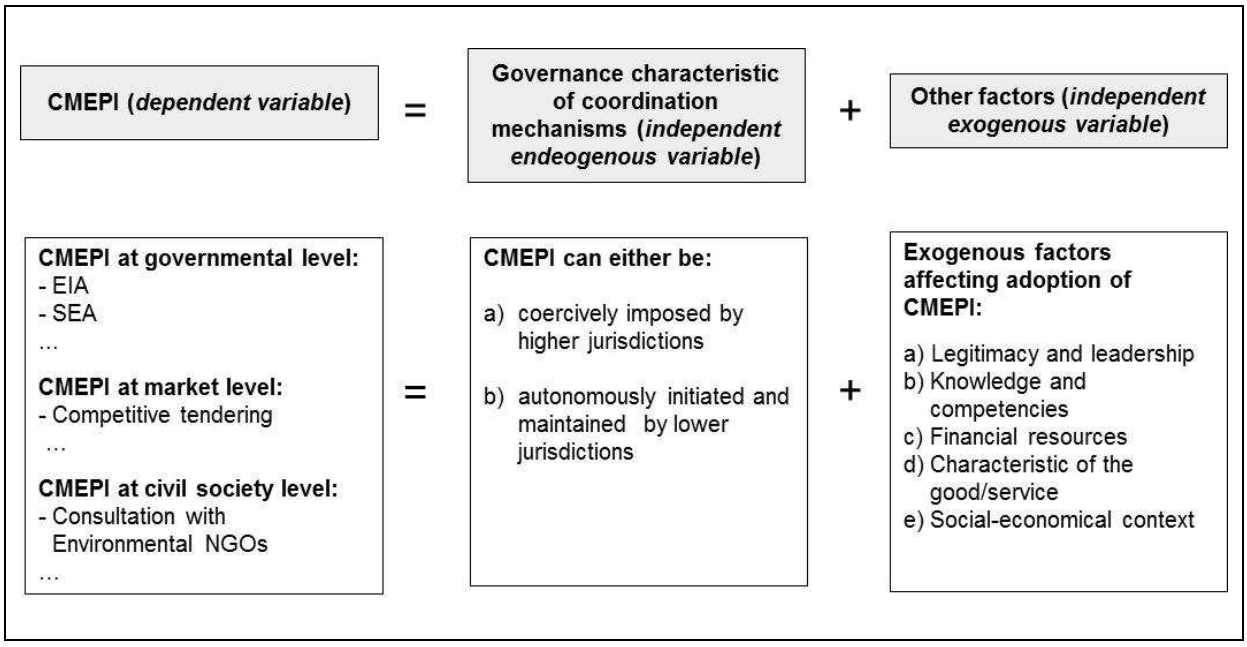
Modal share, as a proxy outcome of measures that promote a modal-shift from car to non-car modes of transport, assumes a continuous variable varying between 0 and 1, or 0% and 100%, for each transport mode considered (car, bus, cycling and walking). Following Jen and Hu (2003) orientation, this research considers as direct explanatory causes of travel modal share the perceived benefits, in terms of cost, time and comfort, of a daily home-work-home journey done by car in opposition to public transportation. The assessment of the perceived benefits might be overlapped with the extent to which environmentally friendlier urban passenger policies are adopted by a region, in the sense that the adoption of these policies are expected to increase benefits of non-motorized modes of travel.

The exogenous variables affecting the adoption of EFUPTM stand, in turn, for a continuous variable, measured by the frequency that each type of barrier is mentioned as an obstacle to the implementation of the package of policies.

3.8.2 Research Hypothesis 2 – Factors promoting CMEPI adoption

In addition to testing if CMEPI stands for more and effective EFUPTM, the research also aims to explore which factors promote the adoption of CMEPI. The literature review performed in section 3.4.2, outlined the major explanatory factors for environmental governance at local level. These were, once again, disaggregated in endogenous and exogenous variables. As sufficient considerations and explanations of these factors were already exposed in that section, this chapter will conceptualize this relationship into the one being tested by the research (figure 3.8.2)

Figure 3.8.2 Conceptual model of factors promoting CMEPI



3.8.2.1 Operationalization of Hypothesis 2 variables

The CMEPI takes the same value as defined in section 3.8.1.1. The governance characteristic of the CMEPI adopts a likert scale that measures the type of CMEPI adoption, whose values range from fully self-imposed to fully self-initiated mechanisms.

Figure 3.8.2.1 – Ordinal scale employed to measure governance typology of adoptions.

Scale	Description
-2	Fully hierarchical (coercively imposed by higher jurisdictions)
-1	More hierarchical than cooperative
0	Partially hierarchical and cooperative
1	More cooperative than hierarchical
2	Fully cooperative (autonomously initiated and maintained by the region)

In opposition to hypothesis 1, the exogenous factors explaining CMEPI adoption are not operationalized as an attempt to measure their intensity. Nonetheless, for some of these factors, those of feasible assessment, like financial resources and the socio-economical context, the research will explore how their variance influences the adoption of CMEPI.

3.9 Research Design

The research unit of analysis consisted of *European cities/metropolitan regions*, *with more than 80.000 inhabitants and a density above 800 inhabitants per Km^2*, *which had participated in any transportation project, either financed by the EU or by another International organization*. Chosen cities had previous experience in transport projects for: i) an easier identification of a feasible respondent; ii) increasing the likelihood of a higher response rate; and iii) a better understanding by the correspondents of the topics covered by the questionnaire. The research material consisted of an online questionnaire, sent out to city correspondents with sufficient knowledge on the urban transport system of their city/region. The aim was to survey as many units as possible with the expectation that the number of answers would enable a statistical analysis. The statistical analysis was the chosen research methodology, as the research aimed to disclose information and test hypothesises related to the CMEPI and EFUPTM. As the majority of variables were assessed by means of a linkert scale, representing respondent's information and perceptions on the adoption and effectiveness of CMEPI and EFUPTM for their city, the research employed nonparametric statistical tests. Whereas Spearman Rho was employed to measure the dependency between two ordinal variables, Kruskal-Wallis test was used to determine whether two or more groups differed on their ordinal/ranked values (Pestana & Gageiro 2009). For the purpose of statistical analysis, the sub-variables were summed up into one single variable whose value reflected the average rating of answers. An example of this computation is presented in Annex VI.

Annex I exhibits the research sample, a total of 109 cities, which included different cities from two European projects: CIVITAS[20] (n=58) and PROESPECTS[21] (n=51). Whereas CIVITAS Project's website had associated the project manager contact details for each city, the PORSPECTS web site only enumerated which cities had answered the survey, without providing any contact details. Therefore, for these cities, additional web search was conducted to find a suitable contact person for the questionnaire which, in most cases,

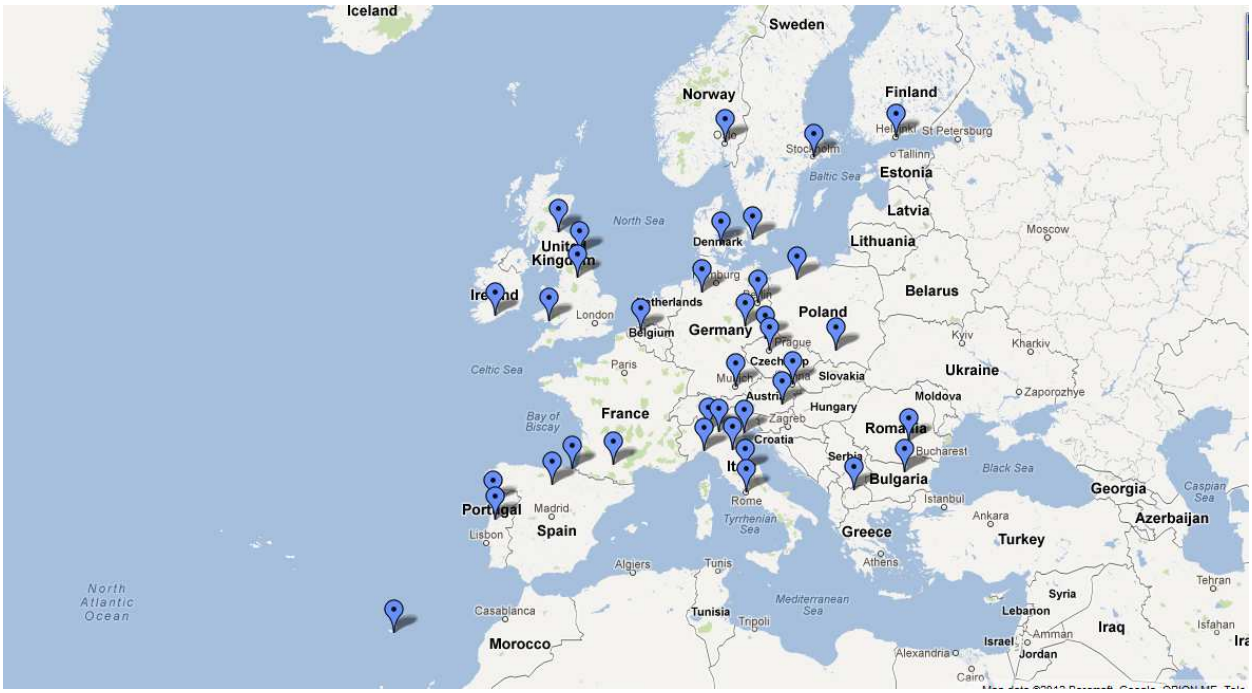
[20] CIVITAS – Cleaner and Better Transport in Cities http://www.civitas-initiative.org/index.php?id=70&sel_menu=6&proj_id=2

[21] PROSPECTS – Procedures for Recommending Optimal Sustainable Planning of European City Transport Systems http://www.ivv.tuwien.ac.at/forschung/projekte/international-projects/prospects-2000.html

ended up to be the standard contact e-mail of the city transport department. This eventually reflected the low number of answers from PROESPECTS cities.

The survey (Annex II) was sent out during the months of February and March 2012. Correspondents were requested to participate by written e-mail communications (Annex III). When correspondents did not answer within two weeks, an e-mail reminder was sent out, in which the participant was also requested to point out the reasons in case of non-participation (Annex IV). Some cities were surveyed with more than one contact person. This was mainly the case for the CIVITAS sampled cities where, in some cases, the survey was sent out to a total of three different contact persons, in order to increase the answer rate. The survey triggered a total of 38 answers, 35% of the sample (figure 3.9.1). Non-European regions were clearly underrepresented in the sample (n=5), which calls for precaution when generalizing conclusions for non-EU cases. General information of the respondent cities is presented in Annex V.

Figure 3.9.1 - City respondents on the map



The number of answers was sufficient to statistically test the correlation of EPI at the procedural level with EPI at the output level. On top of these, other statistical tests were conducted, mainly to explore data relations and to provide inputs for future research. As for the reasons for not answering the questionnaire, three answers were received. Either a busy agenda or the need for the input of diverse stakeholders in order to answer the totality of the surveys' questions, were mentioned as reasons for non-answer. The next section presents the survey results.

4. Survey Results

The survey results are disaggregated into three sections. Section 10.1 deals with the first research hypothesis and exposes the current standpoint of EFUPTM and the extent to which CMEPI stands for higher EFUPTM. Section 10.2 tests the second research hypothesis, and explores which factors influence CMEPI adoption.

4.1 Hypothesis 1 - CMEPI and EFUPTM

The research hypothesis in section 3.4.1 states "*more polycentric forms of environmental governance, which are represented by the multi-scale, multi-sector and multi-actor tools coordination mechanisms promoting EPI, will trigger a higher adoption and effectiveness of environmentally friendly policies*". First, a descriptive analysis of EFUPTM, CMEPI and exogenous factors is presented (4.1.1), after which the analysis of dependency is conducted (4.1.2).

4.1.1 Descriptive analysis

4.1.1.1 Adoption of Coordination Mechanisms for Environmental Policy Integration (CMEPI)

Figure 4.1.1.1 ranks the adoption of the coordination mechanisms to EPI. The most common coordination mechanisms tend to be governmental (partially or largely adopted), followed by the civil society mechanisms (partially adopted). Market based mechanisms are, in average, limitedly adopted.

In terms of specific mechanisms, local plans (including SUTP), EIA, and vertical, horizontal and civil society communication instruments are mentioned as the most usual mechanisms. Less common seem to be the usage of shared budgets, environmental requirements as awarding criteria in public subcontracting, and the existence of an authority responsible to manage the cross-issues between transportation systems and other systems/sectors.

Figure 4.1.1.1 – CMEPI ranks of adoption

	Coordination Mechanisms to EPI (CMEPI)	Unknown	Non existent	Limitedly adopted	Partially adopted	Largely adopted	Rating Average
		NA	0	1	2	3	NA
	Local plans and strategies to improve the environmental performance of local passenger transport system.	1	0	5	10	21	**2,44**
	The usage of Environmental Impact Assessment (EIA) in transport planning	6	5	4	12	11	**1,91**
	Citizen communication instruments (such as citizens' forums and public representatives in the city council) for public participation in transport planning	0	3	8	17	9	**1,86**
	Horizontal communication instruments (such as communication channels, IT technologies, overarching goals, merger of intra-departments, partnerships) across departments for transport planning	2	3	8	16	9	**1,86**
	A local Sustainable Urban Transport Plan (SUTP), in accordance with the designing principles provided by the European Commission's Thematic Strategy on the Urban Environment.	5	6	7	9	11	**1,76**
	Integrated appraisal and assessments methods in transport planning, like Strategic Environmental Assessment (SEA).	5	8	6	8	11	**1,67**

	Vertical communication instruments (such as discussion forums and reporting channels) between local governments (e.g. municipalities) and higher government layers (e.g. regional and/or provincial governments) for transport planning.	1	5	14	8	10	**1,62**
	The existence of NGOs or civil society groups collaborating with local governments in transportation issues.	5	6	11	7	8	**1,53**
	Competitive tendering contracts or other mechanisms to foster competition of transport services	7	8	7	7	8	**1,50**
	The existence of a voluntary environmental compliance agreements, label or code of conduct adopted by public transport operators	10	5	12	5	3	**1,24**
	Strategies to increase public authorities skills in environmental , land-use and transport integrative planning (e.g. joining city networks, promoting job rotation among departments; conducting workshops; joining expertise urban planners networks)	1	7	18	6	4	**1,20**
	The usage of Environmental performance indicators when awarding a transport service to a subcontractor	4	12	9	7	5	**1,15**
	An independent authority responsible for identifying, steering and managing the cross-cutting issues of environmental, land-use and transport planning	6	13	12	5	2	**0,88**
	The existence of a shared budget for integrative transport planning.	9	17	3	4	4	**0,82**

Legend

	Coordination mechanisms to EPI at the Government level
	Coordination mechanisms to EPI at the Market level
	Coordination mechanisms to EPI at the Civil Society level

4.1.1.2 Adoption of Environmentally Friendly Urban Passenger Transport Measures (EFUPTM)

With regards to EFUPTM, measures promoting modal shift towards public transportation are the most common type (partially adopted), followed by integrative land-use and transport and cycling and walking measures (figure 4.1.1.2). Of rarely adoption stand urban road pricing policies.

In individual terms, measures which promote public transportation, like subsidies, network coverage, information and schedules are the most representative policies. Limitedly adopted are car-pooling schemes, low emissions traffic zones and subsidizing measures for greener private vehicles. Urban road pricing schemes and discount parking tariffs for low-emission vehicles are of rarely existence.

Figure 4.1.1.2 – The extent to which EFUPTM are adopted by the respondent cities

Environmentally Friendlier Urban Passenger Transport Policies (EFUPTM)	Unknown / NA	Non existent	Limitedly adopted	Partially adopted	Largely adopted	Rating Average
	NA	0	1	2	3	NA
1) Measures promoting modal shift towards public transportation						**1,92**
Public transport subsidies	0	1	8	7	21	2,30
Wider public transport network coverage	0	1	8	14	14	2,11
Passenger-friendly public transport stops (e.g. seats and ceilings in bus stops)	1	2	6	11	17	2,19
Real time public transport timetables	0	3	5	15	14	2,08
Integration of public transport modes	0	2	7	15	13	2,05
Public transport priority lanes	0	2	9	11	15	2,05
Dynamic public transport information	1	2	8	13	14	2,05
Safety and security measures for public transport (e.g. ensuring safety of bus stops, safe driving behaviour)	0	2	9	14	12	1,97
Park and bus ride facilities	0	1	12	12	12	1,95
Integrated fares for different collective transport modes (tram, bus, metro,	1	7	7	6	16	1,86

train)						
Public transport mobility services for target users (e.g. school and business PT plans)	2	5	7	15	8	1,74
E-ticketing systems for public transport	1	11	8	8	9	1,42
The existence of car pooling schemes	1	11	12	10	3	1,14
2) Integrated land use and transport measures						**1,73**
Regeneration of abandoned or underused city sites (Brownfield land)	3	5	8	11	11	1,80
Urban settlements located around public transport networks	1	5	12	9	10	1,67
3) Cycling and walking measures						**1,66**
Wider pedestrian network (coverage, safety and quality)	1	1	11	11	12	1,97
Extensive cycling network (coverage, safety, quality, parking facilities)	1	2	10	11	13	1,97
Priority traffic measures to pedestrian and cyclists over motorised traffic	1	6	14	11	4	1,37
Integrating cycling with public transport	2	6	15	10	4	1,34
4) Traffic restriction measures						**1,66**
Speed limited zones	0	2	6	14	16	2,16
Car access restriction zones	0	2	10	15	10	1,89
Low emissions traffic zones	1	22	1	7	6	0,92
5) Environmentally friendly parking measures						**1,32**
Parking policy aimed at restricting car travel demand and favouring modal shift (e.g. parking lots outside the inner-city and close to collective transport corridors)	1	4	6	15	10	1,89
Regulation of private parking provision (prices and lots) to promote modal shift and restrict car travel demand	3	5	10	10	8	1,64
Discount parking tariffs for low-emission vehicles	2	25	4	4	1	0,44
6) Measures favouring cleaner fuel and vehicles						**1,18**
Alternative fuels supply (availability and network coverage)	0	8	15	8	7	1,37
Policies subsidizing cleaner public fleets	2	8	13	12	2	1,23
Measures subsidizing cleaner private vehicles	1	14	13	6	3	0,94
7) Urban road pricing measures						**0,35**
Urban road pricing schemes	5	25	1	2	3	0,45
The allocation of urban road pricing revenues to finance the improvement of modal-shift, or cover the environmental impact and side effects of traffic.	4	26	3	1	1	0,26

4.1.1.3 Effectiveness of Environmentally Friendly Urban Passenger Transport Measures (EFUPTM)

When it comes to the effectiveness of each type of EFUPTM (Figure 4.1.1.3), the survey found that integrated land-use and transport measures, followed by measures promoting non-car modal shift, were considered as the most effective measures for environmental protection (between moderately and highly effective). Respondents considered parking regulation and cleaner fuels and vehicles as having a low impact on promoting a more environmentally friendly urban transport system (between low to moderately effective).

Figure 4.1.1.3 – Environmental effectiveness of each type of EFUPTM

To what extent do you perceive the below group of measures as being effective in promoting a more environmentally friendly urban transportation system for your region?	Unknown / NA	Ineffective	Low effective	Moderately effective	Highly effective	Rating Average
	NA	0	1	2	3	NA
2) Integrated land use and transport measures	4	0	2	15	17	**2,44**
1) Measures promoting modal shift towards public transportation	2	0	6	16	14	**2,22**
3) Cycling and walking measures	2	1	8	11	16	**2,17**

4) Traffic restriction measures	4	3	3	14	14	**2,15**
7) Urban road pricing measures	12	8	2	4	12	**1,77**
6) Measures favouring cleaner fuel and vehicles	2	5	10	14	7	**1,64**
5) Environmentally friendly parking measures	8	4	15	5	6	**1,43**

4.1.1.4 Exogenous factors influencing the adoption and effectiveness of Environmentally Friendly Urban Passenger Transport Measures (EFUPTM)

With regards to exogenous factors determining EFUPTM, the most mentioned as relevant was the lack of legitimacy and financial resources (figure 4.1.1.4). On the other end, physical and landscape pattern of cities are mentioned by few respondents as having high influential on EFUPTM.

In terms of exogenous variables for specific types of EFUPTM, legitimacy is most influential for urban road pricing and traffic restriction measures. On the other hand, financial resources are relevant for infrastructures provision or subsidizing measures (cycling and walking, integrated land-use, cleaner fuels and vehicles and modal shift policies). The lack of a coherent policy framework is influential mainly to urban road pricing and integrated transport and land-use policies. On the other hand, the lack of a legal supportive basis is relevant for subsidizing or taxing measures (road pricing, cleaner vehicles and traffic restriction). Finally, knowledge, skills and information and physical factors were mentioned as being more relevant for cycling and walking measures.

Figure 4.1.1.4 – Exogenous factors influencing the adoption and effectiveness of EFUPTM

Exogenous Factors influencing EFUPTM	Urban road pricing	Integrated land use and transport	Cycling and walking	Cleaner fuel and vehicles	Modal shift towards public transport	Traffic restriction	Green parking management	Count: exogenous factor
1) Legitimacy: lack of political or stakeholder acceptance of policies	**25**	7	8	4	9	**25**	8	**86**
2) Funding and financial: lack of resources to finance the establishment of measure	3	**16**	**15**	**21**	**18**	2	7	**82**
3) Incoherent policy framework: lack of a favourable leadership or coalition for EPI	**10**	**13**	6	4	7	6	3	**49**
None	2	6	9	6	7	5	6	**41**
4) Legislative and regulatory: lack of legal supportive basis to adopt or implement measures	**10**	3	2	**7**	1	**5**	4	**32**
5) Knowledge, information and skills: lack of data, instruments and skills in policy design and appraisal	3	5	**8**	5	2	0	4	**27**
Unknown	2	3	1	4	2	1	8	**21**
6) Physical and landscape: lack of a favourable landscape and land-use pattern	1	3	**9**	1	3	1	1	**19**
Count by type of measure	**54**	**50**	**49**	**46**	**42**	**40**	**35**	

4.1.2 Dependency analysis

Before testing dependency between CMEPI and EFUPTM, a call of attention to the study of causality is made. Causality requires that three kinds of pre-conditions are met (King, Keokhane & Verba 1994): i) that the cause precedes its effect (linearity); ii) that variables are correlated (measure of association); and iii) that the correlation is the result of the variance of the dependent variables and not of exogenous variables (non-spuriousness).

Considering the research limitations, these three pre-conditions were met within the following circumstances:

i) Linearity was ensured by considering the EFUTPM (dependent variable) as the result of the policy making tools, procedures and instruments of policy making (independent variable) - which this research labelled as the coordination mechanisms promoting EPI (CMEPI). Nonetheless, it may be the case that a) measures were adopted before the existence of any, or part of, coordination mechanisms for EPI, or b) that the coordination mechanisms exist but policies are on the process of being adopted, or not fully adopted. The way data gathering was performed - one-single time assessment - is unable to cover these situations;

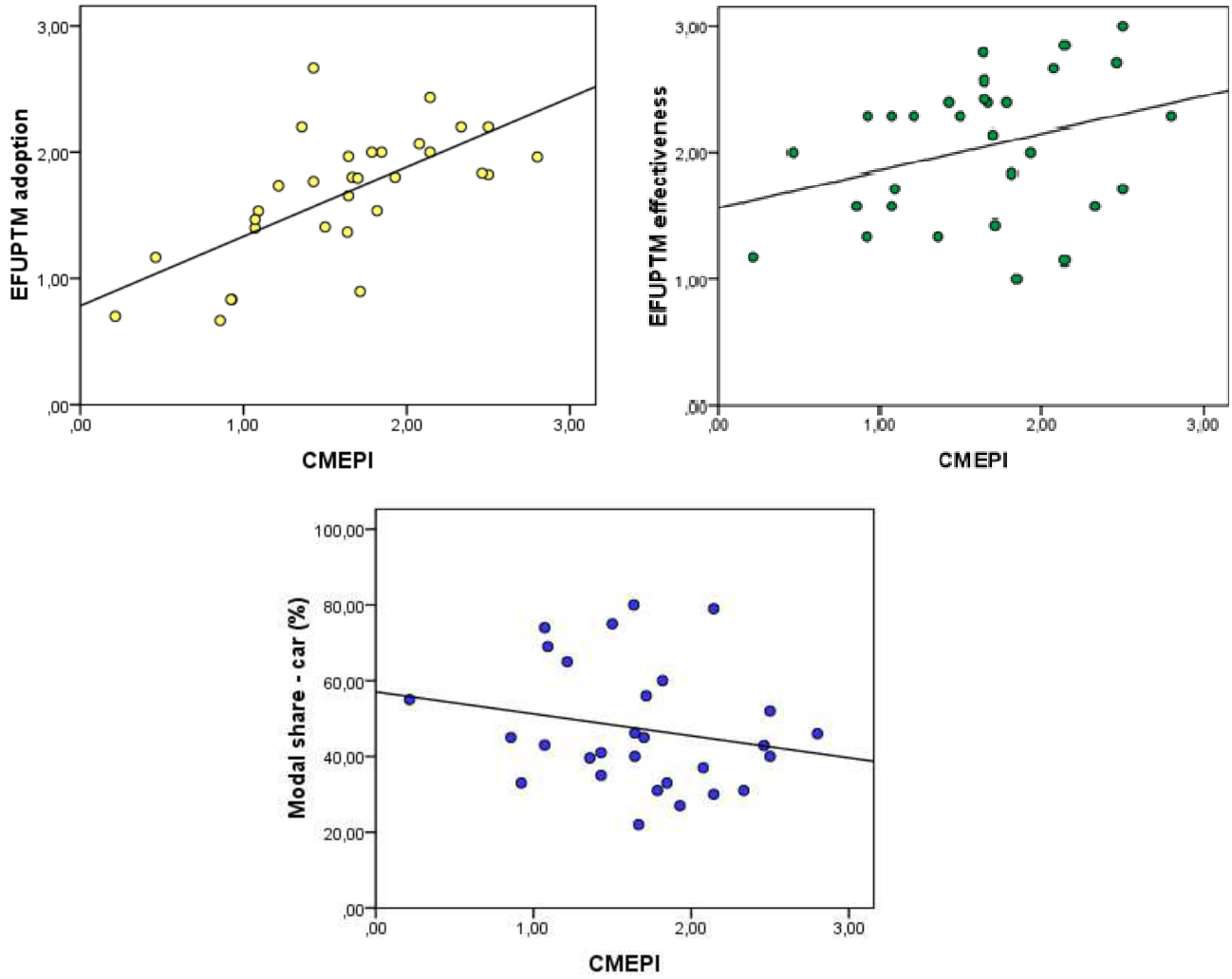
ii) The measure of association considered by this research is the Spearman Rho, as justified in section 3.9.

iii) The exogenous variables represent the remaining variables, in addition to the coordination mechanisms for EPI, which affect the adoption and effectiveness of EFUPTM. The research aims to test correlation for groups of cases yielding similar values of exogenous variables. In this regard, the frequency of exogenous factors, mentioned as being significant for EFUPTM adoption, was used as proxy indicator of cities with similar intensity of exogenous factors.

Do more polycentric forms of governance, which are translated by the CMEPI, stand for more and effective EFUPTM?

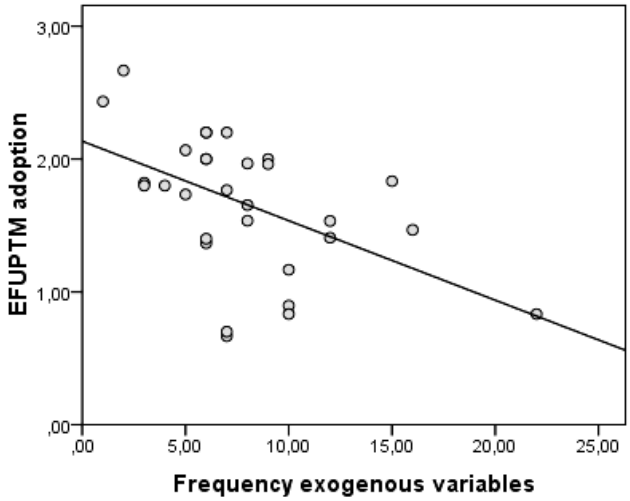
When considering the weight of exogenous variables similar across cases, it is observed that higher ranks of CMEPI's adoption stand for higher adoption and effectiveness of EFUPTM and lower percentages of car share as a mode of travel (figure 4.1.2a). Despite these observations, the trends were found significant only for EFUPTM's adoption (Annex VI, figure 1). As such, the research concludes that, whereas CMEPI seems relevant to influence which EFUPTM measures are adopted, it is not sufficiently strong to predict variances of environmental effectiveness and of modal share across the surveyed cities. The first hypothesis of the research is accepted as valid but only to the extent of adoption.

Figure 4.1.2a – Crosstab between CMEPI and: a) adoption and b) effectiveness of EFUPTM, and c) car share; when considering the impact of exogenous variables similar across cases



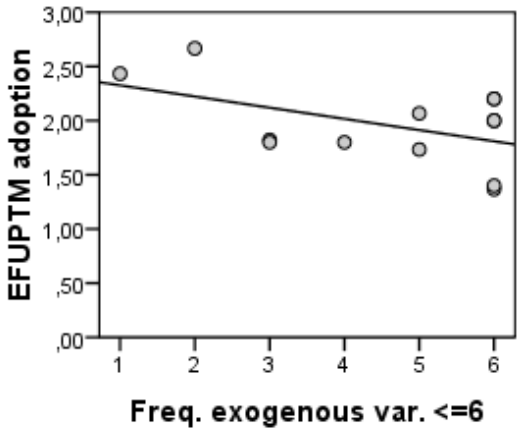
The conclusions of the above chapter can only be considered valid when the weight of exogenous factors influencing EFUPTM is similar across data - as a mean to ensure the non-spuriousness pre-condition of causality (section 4.1.2 iii). In other words, this means that there should not be any significant correlation between EFUPTM and its exogenous factors. However, as figure 4.1.2b exhibits, EFUPTM and exogenous factors seem to be strongly positively related. The correlation is statistically significant given Spearman's rho test of -517 and associated p value of 0,003 (Annex VI, figure 2)

Figure 4.1.2b – Crosstab between adoption of EFUPTM and exogenous variables



Given the significant influence of the exogenous factors on EFUPTM adoption, cases were divided into groups of similar exogenous variables. The plot frequency of exogenous variables show the existence of an outlier observation, Skopje's respondent mentioned 22 times exogenous factors as being significant, which will be excluded from the group (Annex VI, figure 3). The frequency table (Annex VI, figure 4) gives guidance to cluster observations into groups of cases with less than 7 exogenous variables (N= 13) and groups with 7 or more barriers (N=16). Figure 4.1.2c illustrates how EFUPTM varies across the frequency of exogenous variables for two groups of cases. Although a slightly dependency between variables is exhibited, EFUPTM variance across the exogenous variables for each group is not statistically significant (Annex VI, figure 5).

Figure 4.1.2c – Crosstab between EFUPTM and groups of cases with lower (<= 6) and higher (> 6) frequency of exogenous variables.



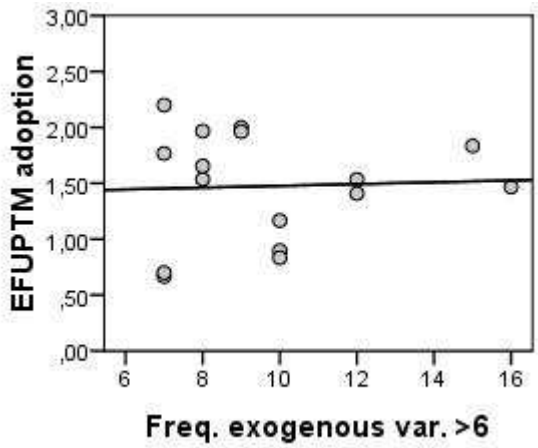


Figure 4.1.2.d presents the values of the dependent and independent variables for each group of different barriers.

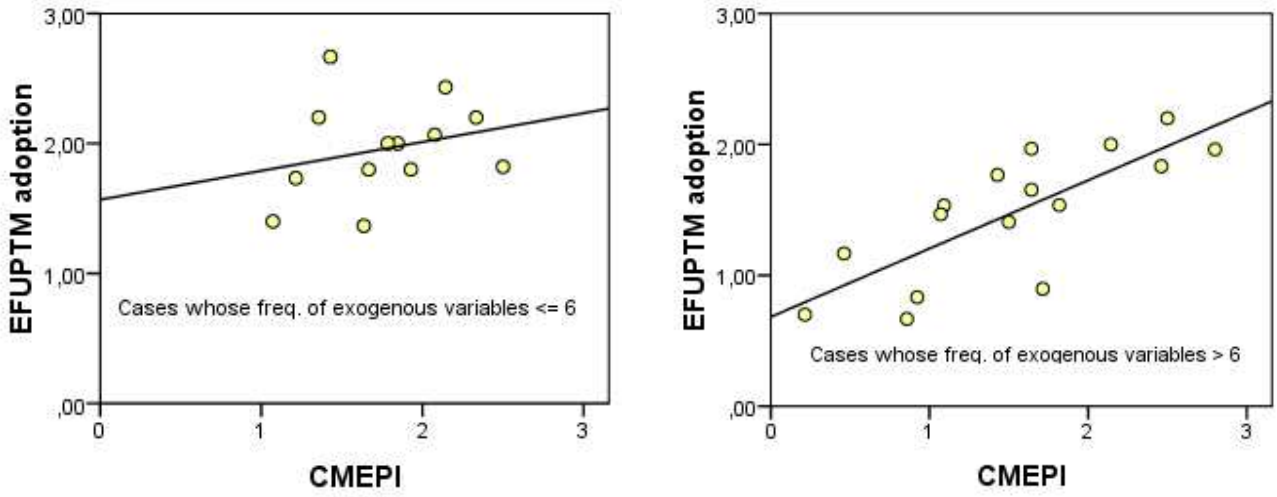
Figure 4.1.2.d – Relation of research variables for the two groups with different values of exogenous variables

Freq. of exogenous variables	Cases	Average of: CMEPI	Average of: EFUPTM	Average Modal Share % Car	Average Modal Share % Non Car
> 6	16	1.44	1.48	51.40	48.13
<= 6	13	1.77	1.96	42.82	56.96
Outliers	9				
	38				

Figure 4.1.2.d outlines the research variables for the two groups of higher and lower influence of exogenous variables. It is found that the adoption of EFUPTM between the two groups of cases with different weights of exogenous factors (1.96 vs 1.48) is statistically significant, given Mann-Whitney U test equal to 48 and respective p value of 0.014 (Annex VI, figure 6). More specifically, the table indicates that cases with lower influence of exogenous variables stand for higher adoption of EFUPTM and lower percentage of car modal share.

We are now in position to analyse the correlation between CMEPI and EFUPTM, ensuring that the non-spuriousness pre-condition of causality is met. Although the cross tab (figure 4.1.2.e) evidences a positive correlation between the variables for both groups of similar exogenous variables, the correlation is only significant for one of the groups with a higher number of barriers (Annex VII, figure 7).

Figure 4.1.2.e – Crosstab between CMEPI and adoption of EFUPTM for the two groups with different values of exogenous variables.



These results support the hypothesis that higher degrees of polycentric coordination mechanisms to EPI, when in presence of favourable exogenous circumstances, stand for a higher adoption of EFUPTM. In case of less favourable exogenous conditions, such as legitimacy and financial constraints, which were the most mentioned constraints to EFUPTM by respondents, CMEPI alone might not be sufficient to promote a higher adoption of EFUPTM. The results also evidenced that CMEPI is irrelevant to explain variances on modal share and on the effectiveness of EFUPTM. It seems that these variables are more influenced by exogenous factors than by the endogenous CMEPI. As figure 4.1.2d exhibits, cases with lower influence of exogenous variables were found associated, in average, with 56.9% of

non-car modal share in comparison to 48.1% of cases with higher frequency of exogenous variables.

4.2. Hypothesis 2 – The adoption of CMEPI

The research also hypothesized, in section 3.4.2, that "*contextual factors exert high influence on the adoption of coordination mechanisms promoting EPI by local actors*".

Whereas literature review evidences several categorizations of factors influencing the adoption of CMEPI, the research only considered as endogenous variables the extent to which CMEPI are requirements for local actors or are self-adopted/initiated. Section 4.2.1 explores the nature of CMEPI adoption and implications for EFUPTM adoption and effectiveness, after which section 4.2.2 attempts to explore how CMEPI varies within different values of exogenous variables (an attempt to understand the relevance of certain exogenous factors for CMEPI adoption).

4.2.1 The nature of CMEPI adoption

With regards to the nature of CMEPI' adoption, partially hierarchical and cooperative, and more cooperative types were found to be the most common forms. Although they were also associated with higher ranks of CMEPI adoption, as figure 4.2.1a exhibits, the differences were not found to be statistically significant (Annex VII, figure 8). The same tendency is followed by the coordination mechanisms promoting EPI that do not face minimal requirements by European Commission[22]. Although, partially hierarchical and cooperative (1.57) and more cooperative than hierarchical (1.74) account for a higher adoption of Green Voluntarily CMEPI, the differences were not statistically confirmed (Annex VII, figure 8). It is interesting to see that highest ranks of CMEPI adoption are found for more cooperative than hierarchical natures of CMEPI (2,07). This recalls for the idea that contextual factors might play a key role in determining the adoptions of CMEPI by local actors to a further level.

Figure 4.2.1a – Nature of coordination vs. the extent to which CMEPI are adopted

		Average of:			
Nature of Coordination	**Cases**	**CMEPI**	**Green Voluntarily CMEPI**	**EFUPTM adoption**	**EFUPTM effectiveness**
Fully hierarchical	2	1.05	0.50	1,26	1,93
More hierarchical than cooperative	5	1.39	0.93	1,39	2,16
Partially hierarchical and cooperative	11	1.60	1.57	1,70	1,83
More cooperative than hierarchical	7	2.07	1.74	1,95	2,16
Fully cooperative	3	1.38	0.94	1,93	2,29
Outliers	10				
	38				

[22] Reminder: these are 6 coordination mechanisms: 1) A local Sustainable Urban Transport Plan (SUTP), in accordance with the designing principles provided by the European Commission's Thematic Strategy on the Urban Environment; 2) Strategies to increase public authorities skills in environmental, land-use and transport integrative planning (e.g. joining city networks, promoting job rotation among departments, conducting workshops, joining expertise urban planners networks); 3) The existence of a shared budget for integrative transport planning; 4) The usage of Environmental performance indicators when awarding a transport service to a subcontractor; 5) The existence of NGOs or civil society groups collaborating with local governments for transportation planning; 6) The existence of a voluntary environmental compliance agreements, label or code of conduct adopted by public transport operators.

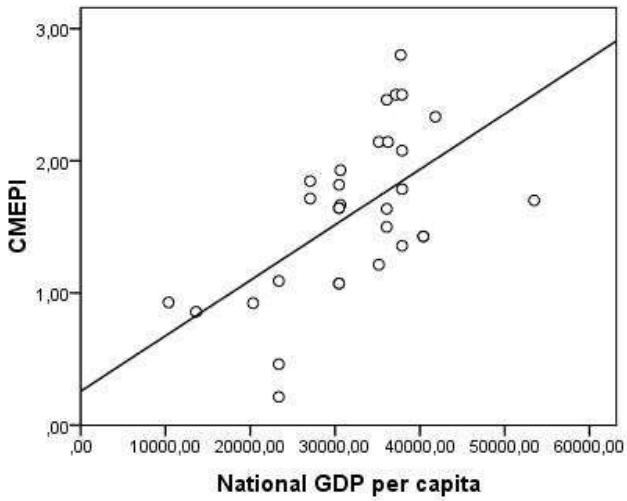
In line with the literature findings, the survey concludes that a mix of compulsory and voluntarily-adopted CMEPI is the most common. Although not statistically proven, these also tend to be associated with higher ranks of EFUPTM adoption. However, given the few number of observations in each group, results might be biased. It is recommended to increase the analysis sample for future research, in order to extend the statistical analysis to situations where cases are aggregated into more than one group.

4.2.2 The weight of exogenous factors on CMEPI's adoption

The weight of exogenous factors on CMEPI adoption is explored, for certain variables, in this section. It is explored whether CMEPI's adoption varies significantly a) across countries with different GDP *per* capita levels; b) and between EU cities and recently joined or non-EU cities. The pertinence of a) relates with the survey results in 4.2.1, in which financial aspects were frequently mentioned as exogenous factors hampering EFUPTM. As such, the research aims to understand if the same is true for CMEPI adoption. As for b), aligned with the literature findings on the factors promoting local environmental protection initiatives, the research expects that European Union's benefits (structural funds, best practices and advisory on urban transport issues, EU directives, etc.) are a catalyst for uplifting the exogenous factors on CMEPI adoption. Therefore, it is expected that EU cities are associated with higher ranks of CMEPI adoption.

Figure 4.2.2a shows a possible positive correlation between national GDP *per* capita and ranks of CMEPI adoption. The correlation is significant and moderate, given Spearman Rho 0,571, p value 0,001 (Annex VII, figure 9). This means that financial considerations seem to play an important role to determine CMEPI adoption by local actors.

Figure 4.2.2a – Nature of coordination vs. the extent to which CMEPI are adopted



With regards to the differences of CMEPI between EU cities and recent or non EU cities[23], it is observed that EU cities account for higher ranks of CMEPI and of Green

[23] "Recent or non EU zone cities" stand for cities whose country are either non-EU members or joined EU after 2003. Norway is an exception and is considered as an outlier

Voluntarily CMEPI than non or recently joined EU cities (figure 4.2.1b), although these differences are not proved statistically (Annex VII, figure 10). Again, it is important to take in consideration the low number of recently joined or non-EU cities (n=5) when stating these conclusions, as data might be biased.

Figure 4.2.1b – Ranks of CMEPI and Green Voluntarily CMEPI adoption by type of city

		Average of:	
Zone	**Cases**	**Coordination Mechanism**	**Green Voluntarily Coordination Mechanism**
EU cities	25	1,68	1.41
Recently joined or non EU cities	5	1,25	0.93
Outliers	8		
	38		

In a nutshell, although a mix of self imposed and self initiative are the most common natures of CMEPI adoption, which although not statistically proven, also happen to be associated with higher ranks of CMEPI adoption, no evidences were found supporting that these stood for more effective EFUPTM. Nonetheless, it might be good to point out that effectiveness of EFUPTM was measured in terms of the ordinal question: *"To what extent do you perceive the below group of measures as being effective in promoting a more environmentally friendly urban transportation system for your region?"* Firstly, the way the question was formulated might have induced a more general answer in terms of potential of a certain measure in promoting environmental protection rather than the effectiveness of current measures in place for the region. Perhaps the question should have been stated as follows: "*How much further do the below group of measures need to be improved to achieve their fully effectiveness*". However, this question is very similar to the extent of adoption, and both answers might have been highly correlated. Secondly, effectiveness could have been linked with a proxy performance variable, as it was the case of modal share. However, this would have been difficult, given the number of external variables that influence these outcomes. For example, in cases of measures reducing car-related emissions, a) it is hard to estimate these emissions; at best, proxy estimation in terms of total journeys and average emissions could be attempted. Yet, data may not be available and, if available, data gathering procedures may vary significantly from case to case, which brings problems of data robustness.

Despite these constraints, given that the majority of adoption tend to be a mix of imposed and exogenous, and given that higher ranks of adoption are found for more cooperative than hierarchic forms of CMEPI, one may conclude that contextual factors have a stake in determining higher adoptions of CMEPI. In terms of exogenous variables, it was found that context variables, more specifically GDP *per* capita, and EU vs. non EU membership, exert moderate to great influence on CMEPI adoption. These evidences were, however, not statistically proven for EU membership, perhaps given the few number of non EU cases in the sample.

5. Conclusions

Environmental policy integration (EPI), which can be defined as an *"early coordination between sector and environmental objectives, in order to find synergies between the two or to set priorities for the environment, where necessary*" (Hey, 2002, p.127 in Persson 2004), represents an important principle and procedure for an environmentally balanced development of societies. Although EPI has become widely supported and advocated by many international organizations and conferences, literature review evidences a lack of EPI evaluative and explanatory studies.

With this consideration, the research goal was to perform an evaluative and explanatory analysis of EPI both at its procedural and output level. Urban passenger transport sector was the chosen field for EPI analysis, as it is a sector accounting for significant environmental and sector specific trade-offs. EPI at the procedural level was labelled as Coordination Mechanisms for EPI (CMEPI), which stood for multi-scale, multi-sector and multi-actor tools, strategies and procedures that promoted the adoption of a) environmental considerations, and of b) cross-sector trade-offs (or externalities) in policy making and service provision. In addition, CMEPI was divided into spheres of governance, namely, government, market and civil society. EPI at the output level was, in turn, defined as Environmentally Friendly Urban Passenger Transport Measures (EFUPTM), and consisted of measures that a) promoted a modal shift from car to non-car travel modes, b) reduced the environmental effects of certain urban travel modes and, to a certain extent, c) reduced the need for urban travel.

The overall research question was: *"Which Coordination Mechanisms for Environmental Policy Integration have been adopted by European cities; and why and to which extent do they promote more Environmentally Friendly Urban Passenger Transport Measures??"*

Literature review on polycentric governance and local collective action advanced two research hypotheses. The first expected that *more polycentric forms of environmental governance, represented by the multi-scale, multi-sector and multi-actor tools coordination mechanisms promoting EPI*, *would trigger a higher adoption and effectiveness of EFUPTM*. The second hypothesized *that contextual factors exerted high influence on the adoption of coordination mechanisms promoting EPI by local actors.* Two conceptual models composed of endogenous and exogenous variables were built for each hypothesis.

The research methodology consisted of an online survey conducted between February and March 2012, and data was retrieved by means of a likert scale, measuring respondent's information and perceptions of each of the research variables. City respondents were selected based on their professional background or affinity to urban transport sector for each city.

The subsequent chapters give answer to the research questions:

5.1 Why, and to which extent, have coordination mechanisms for EPI within Urban Passenger Transport Policies been adopted by European cities?

The most common coordination mechanisms for EPI (CMEPI) tend to be the government ones (partially or largely adopted), followed by civil society mechanisms (partially adopted). Market based mechanisms were found to be, in average, limitedly adopted. In terms of specific mechanisms, local plans (including SUTP), EIA, and vertical, horizontal and civil society communication instruments are mentioned as the most usual

mechanisms. Less common seems to be the employment of shared budgets, environmental requirements as awarding criteria in public subcontracts, and the existence of an authority responsible for managing the cross-issues between transportation systems and other urban sectors.

The reasons for a higher adoption of CMEPI seem to be largely the result of context factors rather than of the existence of binding requirements. Although the most frequent nature of adoption is a mix of imposed and exogenous, higher ranks of adoption, although not statistically significant, were found for more cooperative than hierarchic forms of CMEPI. In terms of the intensity of exogenous variables, it was found that context factors, more specifically national GDP per capita, and EU vs non EU membership, exerted moderate to great influence on CMEPI adoption. However, these evidences were not statistically proven for EU membership, perhaps given the few number of non EU cases in the sample.

5.2 How far have European cities gone in implementing environmentally friendly urban transport policies?

Policies promoting modal shift towards public transportation are the most common type of transport policies (partially adopted), followed by integrative land-use and transport policies and cycling and walking measures. Of rarely adoption are urban road pricing policies. In individual terms, policies directly promoting public transportation, like subsidies, network coverage, information and schedules are the most representative ones. Limitedly adopted are car-pooling schemes, low emissions traffic zones and subsidizing measures for greener private vehicles. Rarely is the existence of urban road pricing schemes and discount parking tariffs for low-emission vehicles.

The lack of legitimacy and financial resources were the most mentioned constraints for implementing EFUPTM to a further level. With regards to specific types of EFUPTM, legitimacy is most influential for urban road pricing and traffic restriction measures. On the other hand, financial resources are relevant for infrastructures provision and subsidizing measures (cycling and walking, integrated land-use, cleaner fuels and vehicles and modal shift policies). The lack of a coherent policy framework is influential mainly to urban road pricing and integrated transport and land-use policies. Finally, the lack of a legal supportive basis is mainly relevant for subsidizing or taxing measures (road pricing, cleaner vehicles and traffic restriction).

5.3 In which way(s) do coordination mechanisms for EPI promote more environmentally urban transport measures across European cities?

The survey results support the hypothesis that higher degrees of polycentric coordination mechanisms to EPI, when in presence of favourable exogenous circumstances, stand for a higher adoption of EFUPTM. In cases of not so favourable exogenous conditions, such as legitimacy and financial constraints, which were the most mentioned constraints to EFUPTM by respondents, CMEPI lone might not be sufficient to promote a higher adoption of EFUPTM. The results also evidenced that CMEPI is unable to explain variances on modal share and on the effectiveness of EFUPTM. It seems that these variables are more influenced by exogenous factors than by the endogenous CMEPI. As figure 4.1.2d exhibits, cases with lower influence of exogenous variables were found associated, in average, with 56.9% of non-car modal share in comparison to 48.1% of cases with higher frequency of exogenous variables.

6. Discussion

6.1 Literature

EPI in urban transport sector will not suffice to achieve fully effective integrative policy outputs if only established to mitigate trade-offs between transportation and environmental dimensions. A more overarching urban transport planning is necessary to advance sustainability at all levels – socio, economic and environment. This is necessary given the overall urban transport externalities, which are not solely confined to transport and environmental sector (see section 3.5), and the overall goals associated with transport sector, which in certain circumstances are found to yield conflictive trade-offs (see section 3.7).

6.2 Methodology

This chapter outlines some considerations on the robustness of the research results. Robustness is assessed by the extent to which a) the research method and conceptual model measures and explains the phenomenon under study, and b) the research results can be replicable and generalized.

i) Foremost, the research data was gathered through a questionnaire. As such, data may be subjectively biased towards respondents' professional background, level of information and other subjective aspects.

ii) Another limitation concerns the way variables were aggregated for statistical analysis. The aggregation assumes an equal weight/distance within likert scale ranks (e.g. non-existence – limitedly adopted – partially adopted – largely adopted) and within different components of each variable (dependent, independent, and exogenous ones). For example, the aggregation considers the existence of "largely adopted" mechanism for EPI as yielding equal weight as three "limitedly adopted" mechanisms. In addition, the method also assumes that different coordination mechanisms, when equally ranked, account for the same weight in promoting EPI at the output level. However, what occurs in reality is that some coordination mechanisms to EPI are more effective than others. This is the case of EIA or SIA, which are more effective in advancing environmental considerations into policy making than shared budgets or cross-departments communication strategies for integrative policy making. The same line of thinking is applied to policy packages and barriers. Some typologies of policies, like policies promoting public transportation, are more environmental effective than, for instance, parking policies restricting car use. In terms of barriers, the weight was done upon the frequency respondents checked the barriers as being significant. However, the frequency may not necessarily be associated with the intensity of the constraint for policy implementation.

Still, the research aimed to understand the direction of correlation and not to establish an econometrical analysis of EPI. As such, the aggregation of variables is considered sufficiently robust to outline a negative or positive trend of data, which in turn is enough to answer the research questions and hypotheses. If econometrical analysis were the aim, then the questionnaire would have been elaborated to gather interval quantifiable data. However, it was unlikely that variables could have been assessed by means of a ratio scale, given the unavailability of data or of an effective mechanism to translate the

extension of adoption into a quantifiable indicator (for example, which indicator should be used to measure the extension of adoption of bus priority lanes, or EIA?)

iii) Another fragility of the research method is related to the way the assessment was performed - a single assessment. This method allows for a snapshot of the phenomena under study in a given moment but does not evaluates it over a certain period of time. A one-off assessment does not fully ensure the linearity principle of causality between: the cause (coordination mechanisms to EPI and exogenous variables) and the effect (package of policies and modal share). Although is logical that policies (EFUPTM) are the result of the policy making procedure in place (CMEPI), the one-off assessment does not cover cases of a) policies which were adopted before any CMEPI associated, or b) cases of policies which are still on the process of being implemented (time lag between policy making and implementation). In addition, a time series assessment would expand the test of causality, by comparing the same observation over a time analysis, instead of comparing effects among cities with different economic, social-historic and environmental backgrounds.

However, given the research constrains of time, a time-series analysis was not possible. As such, the second best option to perform an ex-ante and ex-post assessment was by comparing different cities normalized to similar exogenous factors. With this in mind, the research tried at most to gain enough internal validity by building on an exogenous variable that would accommodate all remaining explanatory causes of EPI at the output level. After that, the research sought to group cases with similar exogenous variables in order to isolate other explanatory variables and effectively test the research hypothesis.

iv) Although the research envisioned surveying similar administrative levels of unit of analysis, e.g. cities, some answers were given from different administrative levels (regions or combined administrative authorities). This had an influence on the results, mainly on the quantifiable ones (modal share and number of public transport providers). In addition, the research included initially two set of variables (modal share and the perceived benefits of travelling by car rather than by bus) given that these either reflected different administrative levels of measurement (e.g. essential relevant to quantify the modal share) or reflected the personal experiences, which could not be generalized.

v) Even though the sample was representative of the total European cities, the respondent rate amounted to 35%. As a consequence, there was a biased of answers in relation to EU membership. The number of non EU cities was low and not large enough to generalize the observed differences between EU and non EU groups.

vi) From the conceptual model, one limitation is related to the complexity of the phenomena under study by this research and the way it was accommodated into a simple explanatory model of analysis. The research analysis units greatly differ among themselves in many factors, which are unlikely to be solely the result of the coordination mechanisms to EPI and the exogenous factors for EFUPTM implementation. Reducing the discrepancies within cities to these set of variables and with an ordinal assessment is unlikely to represent and measure, with enough detail and accuracy, the overall differences between cities.

In addition, not all policies promoting EFUPTM were considered. For example, the on-line provision of urban services, such as e-shopping, e-working and e-learning, were not considered in the package of EFUPTM and assessed by the research.

vi) Another limitation of the conceptual model concerns the assessment of explanatory factors influencing CMEPI adoption, which is short in endogenous validity. The research only considered as endogenous variables the characteristics of the CMEPI – hierarchical/cooperative, where there are many other explanatory factors. These were considered as exogenous and not directly assessed by the survey. The research could have

attempted to measure them by, for example, asking respondents to point out the current prioritization of transport policy (if accessibility, environmental, social inclusion, etc.) or to assess the competencies and knowledge of professionals on environmental aspects and on CMEPI. However, the majority of these factors were considered as exogenous variables.

7. Future research recommendations

In order to increase the robustness of the conclusions, and allow the generalization to a greater extent, it is recommended that future research should:

a) Extend the sample of analysis with the inclusion of more EU, non EU and American city cases, in order to increase the potential of statistical treatment of data and look over different groups of cases.

b) Attempt a time-series assessment and test causality for the same city.

c) Simultaneously with b), extend the evaluative analysis over environmental impacts in order to test EPI at all levels: procedural, output and outcome level.

d) Extend the assessment over other sectors (e.g. housing, agriculture or industry sectors) and understand if coordination mechanisms for EPI are also associated with higher environmentally friendlier measures and less environmental burden impacts.

e) Complement research method with case studies and interviews for a better understanding and exploration of the second research hypothesis (which factors explain CMEPI adoption)

f) Increase the endogenous variables in both conceptual models and hypotheses.

g) Extend the degree of policy integration to other sectors beyond the environmental one. For instance, extend EPI to the social dimensions both at the procedure and output level.

8. Policy recommendations

Urban passenger transport sector is a key system for urban agglomerations, as it is the system through which citizens fulfil their working and leisure needs. However, current urban travel patterns exert greater negative impacts on the environment. Whereas EPI is generally proclaimed as an essential procedure for meeting sector specific goals within acceptable levels of environmental impacts, current fragmentation of policy making and service provision in urban transport sector – which are a consequence of the trade-offs between transport and other urban sectors (e.g. land-use and social inclusion), and of a higher involvement of non-governmental actors in service provision – brings the challenge of ensuring environmental integration across a diffusive source of urban transport impacts.

Solving fragmentation itself is not the way forward. Theories of polycentric governance show how more polycentric forms of policy making and service provision yield the benefit of flexible, specialized, cost-effective and more democratic means of policy and service provision when compared to more centralistic modes. In this consideration, polycentrism governance should be the way forward and urban passenger environmental impacts are likely to be best managed by multi-scale, multi-sector and multi-actor tools, strategies and procedures that promote the adoption of environmental considerations, and of transport-sector trade-offs.

The results of this research do show the validity of this hypothesis, and hence local actors should accommodate themselves towards more polycentric modes of EPI across government, market and civil society levels. A especial recommendation is to further extend the CMEPI at the market level (subcontracting out services, setting up environmental performances as awarding criteria, environmental code of conduct for the industry) as these mechanisms were found limitedly adopted in the surveyed cities.

The research also concludes that a wider adoption of CMEPI is very dependent on contextual factors (knowledge and competencies, financial resources, legitimacy and leadership, to name few). Hence, a first recommendation for EPI should be to equip cities with proper levels of contextual variables for CMEPI adoption. This can be done for example, by: a) establishing cooperation networks between cities to increase knowledge and diffusion of best practices in EPI in transport sector; b) advancing external financial benefits for CMEPI; c) rising the involvement of civil society and specific environmental NGOs in the process of transport planning and environmental supervision.

Annexes

Annex I – Sample of cities

Project Name	Date	Cities	Home Page
PROSPECTS (Procedures for Recommending Optimal Sustainable Planning of European City Transport Systems)	2000-2003 51 cities)	Klosterneuburg (Austria); Steyr (Austria); Vienna (Austria); Gent (Belgium); Rousse (Bulgaria); Silistra (Bulgaria); Litomysl (Czeck Republic); Saarbrücken (Germany); Leipzig (Germany); Dortmund (Germany); München (Germany); Helsinki (Finland); Kuopio (Finland); Jyvaskyla (Finland); Bordeaux (France); Brest (France); Dijon (France); Lyon (France); Marseille (France); Metz (France); Rennes (France); Saint-Etienne (France); Toulouse (France); Tours (France); Cork (Ireland); Dublin (IrelandFirenze (Italy); Kaunas (Lithuania). Vilnius (Lithuania); Kristiansand (Norway); Oslo (Norway); Stavanger and Sandnes (Norway); Troms (Norway); Krakow (Poland); Lodz (Poland); Amadora (Portugal); Coimbra (Portugal); Alcala de Henares (Spain); Aranjez (Spain); Arganda (Spain); Barcelona (Spain); Ciudad Real (Spain); Granada (Spain); Madrid (Spain); Pamplona (Spain); Salamanca (Spain); Santander (Spain); Valencia (Spain); Malmö Gatukontor (Sweden); Stockholm (Sweden); Umeå (Sweden); Uppsala (Sweden); St. Gallen (Switzerland); Zürich (Switzerland); Brighton (UK); Chesterfield (UK); Edinburgh (UK); Leeds (UK); Milton Keynes (UK); Norwich (UK); Sunderland (UK); Swansea (UK)	http://www.ivv.tuwien.ac.at/forschung/projekte/international-projects/prospects-2000.html

CIVITAS (Cleaner and Better Transport in Cities) (I II & III)	2002-2012 (58 cities)	Graz (A), Lille (F), Pécs (H), Praha (CZ), Stockholm (SE), Aalborg (DK), Bremen (D), Bristol (UK), Kaunas (LT), Nantes (F), Berlin (D), Bucharest (RO), Gdynia (PL), Göteborg (SE), Rotterdam (NL), Cork (IE), Roma (I), Winchester (UK), Barcelona (ES), Debrecen (H), Ljubljana (SLO), Odense (DK), Toulouse (F), Venezia (I), Malmö (SE), Norwich (UK), Potenza (I), Suceava (RO), Tallinn (EE), La Rochelle (F), Ploiesti (RO), Preston (UK), Burgos (ES), Genova (I), Kraków (PL), Stuttgart (D), Bath (UK), Gorna Oryahovitsa (BG), Perugia (I), Skopje (MK), Szczecinek (PL), Bologna (I), Funchal (PT), Gdansk (PL), Tallinn (EE), Utrecht (NL), Brescia (I), Coimbra (PT), Craiova (RO), Vitoria - Gasteiz (ES), Aalborg (DK), Brighton & Hove (UK), Donostia - San Sebastián (ES), Iasi (RO), Monza (I), Usti nad Labem (CZ), Brno (CZ), Gent (B), Ljubljana (SLO), Porto (PT), Zagreb (CR)	http://www.civitas-initiative.org/index.php?id=70&sel_menu=6&proj_id=2

Annex II – Online survey

Environmental Policy Integration in Urban Passenger Transport Policies

2. Questionnaire

1. Respondent's Information

City's name:

Respondent's name:

Respondent's email:

Profession:

Organization:

2. Which of the following scenarios best describes the relation of land-use, environment and transport departments for your region?

- ◯ Unknown / No answer
- ◯ Integrated departments
- ◯ Separated departments
- ◯ Integrated environmental and land-use departments and a separated transport department
- ◯ Integrated transport and land-use departments and a separated environmental department

Other scenario (please specify)

3. Please indicate the modal share, in percentage, of the following transportation modes for your region:

Public Transport

Car

Cycling

Walking

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4. Which is the nature of provision of the following services?

	Unknown / No answer	Only state providers	Only private providers	State and private providers
Collective bus operators	◯	◯	◯	◯
Road and infrastructure construction	◯	◯	◯	◯
Road and infrastructure maintenance	◯	◯	◯	◯
Traffic and environmental monitoring	◯	◯	◯	◯

5. What is the number of bus company providers active in your region?

- ◯ Unknown / No answer
- ◯ 0
- ◯ 1
- ◯ 2
- ◯ 3
- ◯ more than 3

6. In your opinion, what is the benefit of travelling by car in opposite to bus, considering a daily journey from home to work, and vice versa, with regards to the following dimensions:

	Unknown / No answer	Car has greater advantages	Car has some advantages	Relatively similar in both modes	PT has some advantages	PT has greater advantages
Cost	◯	◯	◯	◯	◯	◯
Time	◯	◯	◯	◯	◯	◯
Comfort	◯	◯	◯	◯	◯	◯

Comments

Environmental Policy Integration in Urban Passenger Transport Policies

7. To which extent are the following coordination mechanisms adopted by your region? (Coordination mechanisms are here defined as procedures and technics employed by local authorities and civil society to integrate environmental considerations in transport planning)

	Unknown / No answer	Nonexistent	Limitedly adopted	Partially adopted	Largely adopted
1) Local plans and strategies to improve the environmental performance of local passenger transport system.	◯	◯	◯	◯	◯
2) A local Sustainable Urban Transport Plan (SUTP), in accordance with the designing principles provided by the European Commission's Thematic Strategy on the Urban Environment.	◯	◯	◯	◯	◯
3) Vertical communication instruments (such as discussion forums and reporting channels) between local governments (e.g. municipalities) and higher government layers (e.g. regional and/or provincial governments) for transport planning.	◯	◯	◯	◯	◯
4) Horizontal communication instruments (such as communication channels, IT technologies, overarching goals, merger of intra-departments, partnerships) across	◯	◯	◯	◯	◯

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departments for transport planning					
5) Integrated appraisal and assessments methods in transport planning, like Strategic Environmental Assessment (SEA).	◯	◯	◯	◯	◯
6) The usage of Environmental Impact Assessment (EIA) in transport planning	◯	◯	◯	◯	◯
7) An independent authority responsible for identifying, steering and managing the cross-cutting issues of environmental, land-use and transport planning	◯	◯	◯	◯	◯
8) Strategies to increase public authorities skills in environmental , land-use and transport integrative planning (e.g. joining city networks, promoting job rotation among departments; conducting workshops; joining expertise urban planners networks)	◯	◯	◯	◯	◯
9) The existence of a shared budget for integrative transport planning.	◯	◯	◯	◯	◯
10) Competitive tendering contracts or other mechanisms to foster competition of transport services	◯	◯	◯	◯	◯
11) The usage of	◯	◯	◯	◯	◯

Environmental performance indicators when awarding a transport service to a subcontractor					
12) Citizen communication instruments (such as citizens' forums and public representatives in the city council) for public participation in transport planning	◯	◯	◯	◯	◯
13) The existence of a voluntary environmental compliance agreements, label or code of conduct adopted by public transport operators	◯	◯	◯	◯	◯
14) The existence of NGOs or civil society groups collaborating with local governments in transportation issues.	◯	◯	◯	◯	◯

Others coordination mechanisms favouring environmental protection (please specify)

Environmental Policy Integration in Urban Passenger Transport Policies

8. What is the nature of the coordination mechanisms, outlined in question 7, adopted by your region?

- ◯ Fully hierarchical (coercively imposed by higher jurisdictions)
- ◯ More hierarchical than cooperative
- ◯ Partially hierarchical and partially cooperative
- ◯ More cooperative than hierarchical
- ◯ Fully cooperative (autonomously initiated and maintained by the region)

If possible, please specify (by numbering) which mechanisms are hierarchical and which are cooperative (for example: 1), 2) and 3) are hierarchical and the remaining cooperative)

The next questions cover the extent to which urban passenger transport measures favouring environmental protection h by your region. The questions are subdivided by measure typology:

9) Integrated land use and transport planning development
10) Modal shift towards public transport
11) Cycling and walking
12) Green parking management
13) Urban road pricing
14) Traffic restriction
15) Cleaner fuel and vehicles

9. To which extent are measures favouring Integrated land use and transport planning adopted by your region?

	Unknown / No answer	Nonexistent	Limitedly adopted	Partially adopted	Largely adopted
Regeneration of abandoned or underused city sites (Brownfield land)	◯	◯	◯	◯	◯
Urban settlements located around public transport networks	◯	◯	◯	◯	◯

Other Land-use policies reducing the need to travel (please specify)

Environmental Policy Integration in Urban Passenger Transport Policies

10. To which extent are measures favouring modal shift towards public transport adopted by your region?

	Unknown / No answer	Nonexistent	Limitedly adopted	Partially adopted	Largely adopted
Wider public transport network coverage	◯	◯	◯	◯	◯
Integration of public transport modes	◯	◯	◯	◯	◯
Park and bus ride facilities	◯	◯	◯	◯	◯
Public transport subsidies	◯	◯	◯	◯	◯
Dynamic public transport information	◯	◯	◯	◯	◯
Real time public transport timetables	◯	◯	◯	◯	◯
Passenger-friendly public transport stops (e.g seats and ceelings in bus stops)	◯	◯	◯	◯	◯
E-ticketing systems for public transport	◯	◯	◯	◯	◯
Integrated fares for different collective transport modes (tram, bus, metro, train)	◯	◯	◯	◯	◯
Public transport priority lanes	◯	◯	◯	◯	◯
Public transport mobility services for target users (e.g school and business PT plans)	◯	◯	◯	◯	◯
Safety and security measures for public transport (e.g. ensuring safety of bus stops, safe driving behavior)	◯	◯	◯	◯	◯
The existence of car pooling schemes	◯	◯	◯	◯	◯

Other measures favouring modal shift towards public transport (please specify)

11. To which extent are measures promoting cycling and walking adopted by your region?

	Unknown / No answer	Nonexistent	Limitedly adopted	Partially adopted	Largely adopted
Wider pedestrian network (coverage, safety and quality)	◯	◯	◯	◯	◯
Extensive cycling network (coverage, safety, quality, parking facilities)	◯	◯	◯	◯	◯
Integrating cycling with public transport	◯	◯	◯	◯	◯
Priority traffic measures to pedestrian and cyclists over motorised traffic	◯	◯	◯	◯	◯

Other measures encouraging cycling and walking (please specify)

Environmental Policy Integration in Urban Passenger Transport Policies

12. To which extent are parking management measures favouring modal shift adopted by your region?

	Unknown / No answer	Nonexistent	Limitedly adopted	Partially adopted	Largely adopted
Parking policy aimed at restricting car travel demand and favouring modal shift (e.g. parking lots outside the inner-city and close to collective transport corridors)	◯	◯	◯	◯	◯
Regulation of private parking provision (prices and lots) to promote modal shift and restrict car travel demand	◯	◯	◯	◯	◯
Discount parking tariffs for low-emission vehicles	◯	◯	◯	◯	◯

Other parking management measures favouring modal shift (please specify)

13. To which extent are urban road pricing measures adopted by your region?

	Unknown / No answer	Nonexistent	Limitedly adopted	Partially adopted	Largely adopted
Urban road pricing schemes	◯	◯	◯	◯	◯
The allocation of urban road pricing revenues to finance the improvement of modal-shift, or cover the environmental impact and side effects of traffic.	◯	◯	◯	◯	◯

Other urban road pricing measures (please specify)

Environmental Policy Integration in Urban Passenger Transport Policies

14. To which extent are traffic restriction measures adopted by your region?

	Unknown / No answer	Nonexistent	Limitedly adopted	Partially adopted	Largely adopted
Speed limited zones	◯	◯	◯	◯	◯
Low emissions traffic zones	◯	◯	◯	◯	◯
Car access restriction zones	◯	◯	◯	◯	◯

Other traffic restriction measures (please specify)

15. To which extent are measures promoting the usage of cleaner fuel and vehicles adopted by your region?

	Unknown / No answer	Nonexistent	Limitedly adopted	Partially adopted	Largely adopted
Policies subsidizing cleaner public fleets	◯	◯	◯	◯	◯
Measures subsidizing cleaner private vehicles	◯	◯	◯	◯	◯
Alternative fuels supply (availability and network coverage)	◯	◯	◯	◯	◯

Other cleaner fuel and vehicles measures (please specify)

Environmental Policy Integration in Urban Passenger Transport Policies

16. To what extent do you perceive the below group of measures as being effective in promoting a more environmentally friendly urban transportation system for your region?

	Unknown / No answer	Ineffective	Low effective	Moderately effective	Higly effective
9) Integrated land use and transport planning development	◯	◯	◯	◯	◯
10) Modal shift towards public transport	◯	◯	◯	◯	◯
11) Cycling and walking	◯	◯	◯	◯	◯
12) Green parking management	◯	◯	◯	◯	◯
13) Urban road pricing	◯	◯	◯	◯	◯
14) Traffic restriction	◯	◯	◯	◯	◯
15) Cleaner fuel and vehicles	◯	◯	◯	◯	◯

Comments

Environmental Policy Integration in Urban Passenger Transport Policies

17. Which of the following barriers do you perceive as being a major obstacle for the successfully implementation of each group of measures for your region? (You can tick several options)

	Unknown / No answer	None	Lack of public or stakeholder acceptance of policies	Lack of a coherent policy framework (unfavorable leadership or coalition, or adversarial environment)	Lack of legal supportive basis to adopt or implement measures	Lack of resources to finance the establishment of measure	Lack of data, instruments and skills	Lack of a favourable landscape and land-use pattern
9) Integrated land use and transport planning development	☐	☐	☐	☐	☐	☐	☐	☐
10) Modal shift towards public transport	☐	☐	☐	☐	☐	☐	☐	☐
11) Cycling and walking	☐	☐	☐	☐	☐	☐	☐	☐
12) Green parking management	☐	☐	☐	☐	☐	☐	☐	☐
13) Urban road pricing	☐	☐	☐	☐	☐	☐	☐	☐
14) Traffic restriction	☐	☐	☐	☐	☐	☐	☐	☐
15) Cleaner fuel and vehicles	☐	☐	☐	☐	☐	☐	☐	☐

Others barriers (please specify)

18. In general, how satisfied are you with the urban passenger transport system of your region?

	Very dissatisfied	Somewhat dissatisfied	Neither satisfied nor dissatisfied	Somewhat satisfied	Very satisfied
.	◯	◯	◯	◯	◯

Comments

Environmental Policy Integration in Urban Passenger Transport Policies

19. In your opinion, what factors would improve the economical and environmental efficiency of your region's urban passenger transport system?

The questionnaire finishes here.
Thank you very much for your time.
Please use the following text box, in the case you wish to add your coments or feedback

Kind Regards,
David Castro
davidjosemotacastro@students.uu.nl
davidjmcastro@gmail.com

20. Would you like to receive a copy of the overall survey's results?

- ◯ Yes
- ◯ No

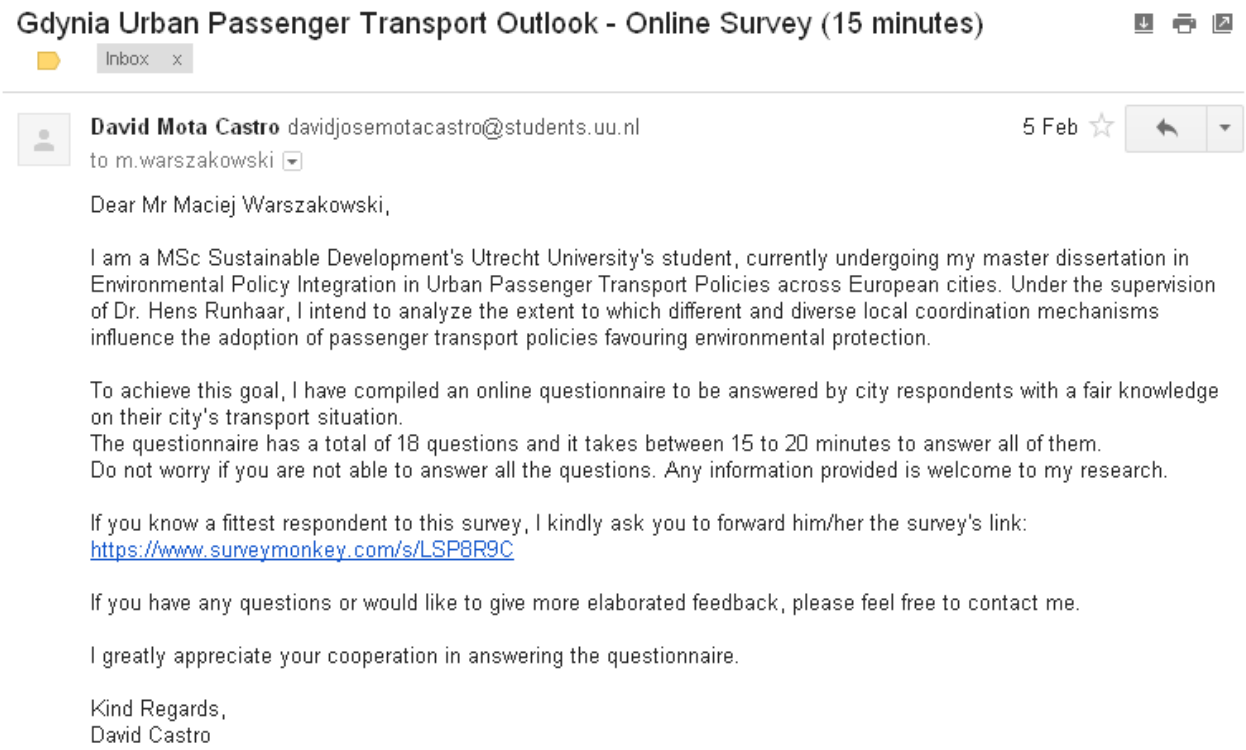
21. In case survey's results are communicated to external parties would you like to have your personal information disclosed?

- ◯ Yes (disclosed my personal information)
- ◯ No (undisclosed my personal information)

Other (please specify)

22. Please, use the following box for your comments and feeback.

Annex III – E-mail communication



Gdynia Urban Passenger Transport Outlook - Online Survey (15 minutes)

Inbox x

David Mota Castro davidjosemotacastro@students.uu.nl 5 Feb

to m.warszakowski

Dear Mr Maciej Warszakowski,

I am a MSc Sustainable Development's Utrecht University's student, currently undergoing my master dissertation in Environmental Policy Integration in Urban Passenger Transport Policies across European cities. Under the supervision of Dr. Hens Runhaar, I intend to analyze the extent to which different and diverse local coordination mechanisms influence the adoption of passenger transport policies favouring environmental protection.

To achieve this goal, I have compiled an online questionnaire to be answered by city respondents with a fair knowledge on their city's transport situation.
The questionnaire has a total of 18 questions and it takes between 15 to 20 minutes to answer all of them.
Do not worry if you are not able to answer all the questions. Any information provided is welcome to my research.

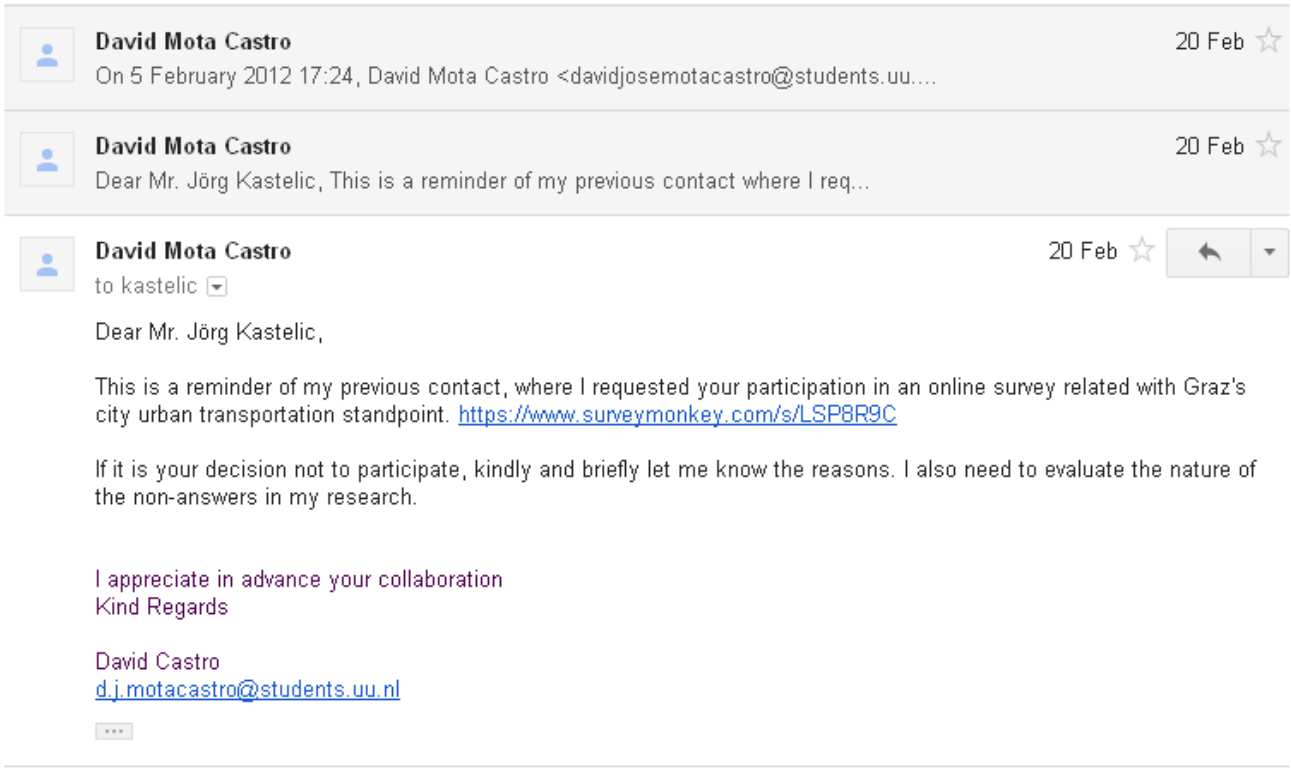
If you know a fittest respondent to this survey, I kindly ask you to forward him/her the survey's link:
https://www.surveymonkey.com/s/LSP8R9C

If you have any questions or would like to give more elaborated feedback, please feel free to contact me.

I greatly appreciate your cooperation in answering the questionnaire.

Kind Regards,
David Castro

Annex IV – E-mail reminder



David Mota Castro 20 Feb

On 5 February 2012 17:24, David Mota Castro <davidjosemotacastro@students.uu....

David Mota Castro 20 Feb

Dear Mr. Jörg Kastelic, This is a reminder of my previous contact where I req...

David Mota Castro 20 Feb

to kastelic

Dear Mr. Jörg Kastelic,

This is a reminder of my previous contact, where I requested your participation in an online survey related with Graz's city urban transportation standpoint. https://www.surveymonkey.com/s/LSP8R9C

If it is your decision not to participate, kindly and briefly let me know the reasons. I also need to evaluate the nature of the non-answers in my research.

I appreciate in advance your collaboration
Kind Regards

David Castro
d.j.motacastro@students.uu.nl

Annex V – Survey respondents

City General Information						Urban Spatial Information		
#	Project	City	Country	Year of entry in EU	GDP per capita (USD)	Population	Area	Urban Density
1	Civitas	Graz	Austria	1995	41,822	261,540	127.56 km2	2,050 /km2
2	Civitas	Gent	Belgium	1952	37,737	243,366	156.18 km2	1,558.2/km2
3	Civitas	Gorna Oryahovitsa	Bulgaria	2007	13,597	32,436	21.108 km2	1,,523/Km2
4	Civitas	Praha	Czech Republic	2004	27,062	1,290,846	496 Km2	2,602.5/km
5	Civitas	Usti nad Labem	Czech Republic	2004	27,062	95,464	93.95 km2	1,021/Km2
6	Civitas	Odense	Denmark	1973	37,152	190,245	304.34 km2	1,662/km2
7	Civitas	Toulouse	France	1952	35,156	439,553	118.3 km2	3,716 /km2
8	Civitas	Berlin	Germany	1952	37,897	3,479,740	891.85 km2	3,901.7/km2
9	Civitas	Bremen	Germany	1952	37,897	547,535	326.73 km2	1,676 /km2
10	Civitas	Bologna	Italy	1952	30,464	382,460	140.7 km2	2,718.3/km2
11	Civitas	Brescia	Italy	1952	30,464	197,250	90.7 km2	2,174.8/km2
12	Civitas	Genova	Italy	1952	30,464	607,771	243.60 km2	2,495/km2
13	Civitas	Monza	Italy	1952	30,464	121,466	33.03 km2	3,677.4/km2
14	Civitas	Perugia	Italy	1952	30,464	168,066	449.92 km2	373.5/km2
15	Civitas	Roma	Italy	1952	30,464	2,761,477	1,285.31 km2	2,148.5/km2
16	Civitas	Venezia	Italy	1952	30,464	270,660	414.57 km2	652.9/km2
17	Civitas	Skopje	Macedonia	N/A	10,367	668,518	571.46 km2	1,169.8/km2
18	Civitas	Kraków	Poland	2004	20,334	756,267	327 km2	2,312.7/km2
19	Civitas	Szczecinek	Poland	2004	20,334	40,211	48.63 km2	826.9/km2
20	Civitas	Coimbra	Portugal	1986	23,361	101,069	319,41 km²	448,94 Km2
21	Civitas	Funchal	Portugal	1986	23,361	111,892	148 Km2	1,323 / km2
22	Civitas	Porto	Portugal	1986	23,361	1,286,138	389 km2	3,306 /Km2
23	Civitas	Cork	Republic of Ireland	1973	39,639	119,418	37.3 km2	3,194.18/km2
24	Civitas	Ploiesti	Romania	2007	12,476	227,194	58.2 km2	3,924/km2
25	Civitas	Burgos	Spain	1986	30,626	178,574	108 km2	1,667.67/km2
26	Civitas	Donostia - San Sebastián	Spain	1986	30,626	186,122	60.89 km2	3,010.48/km2
27	Civitas	Malmö	Sweden	1995	40,394	280,415	76.81 km2	3,651/km2
28	Civitas	Stockholm	Sweden	1995	40,394	861,010	188 km2	4,579.8/km^2
29	Prospects	Vienna	Austria	1995	41,822	837,031	188.km2	3,900/km2
30	Prospects	Helsinki	Finland	1995	36,236	596,233	715.49 km2	2,789.39/km2
31	Prospects	Brest	France	1952	35,156	142,097	49.51 km2	2,870 /km2
32	Prospects	Leipzig	Germany	1952	37,897	522,883	297.60 km2	1,757 /km2
33	Prospects	München	Germany	1952	37,897	1,353,186	310.43 km2	4,359 /km2
34	Prospects	Oslo	Norway	N/A	53,471	613,285	285.26 km2	3,200/km2
35	Prospects	Edinburgh	UK	1973	36,090	817,800	259.0 km2	1,844/km2
36	Prospects	Leeds	UK	1973	36,090	798,800	551.72 km2	1,380/km2
37	Prospects	Sunderland	UK	1973	36,090	280,807	137.46 km2	2,042.8/km2
38	Prospects	Swansea	UK	1973	36,090	232,500	378 km2	601/km2

Sources:

Spatial Information – Wikipedia, Retrieved January, 11, 2012 from http://en.wikipedia.org

Year of entry in EU – European Union, Retrieved January, 11, 2012 from http://europa.eu/about-eu/countries/index_en.htm

GDP per capita – International Monetary Fund data base, Retrieved April, 11, 2012 from http://www.imf.org/external/pubs/ft/weo/2012/01/weodata/index.aspx

Annex VI – Example of how the aggregation of the coordinantion mechanisms to EPI was perfumed. Case of Toulouse

Coordination Mechanisms to EPI	Respondent answer	Ordinal Ranking
Local plans and strategies to improve the environmental performance of local passenger transport system.	Largely adopted	3
The usage of Environmental Impact Assessment (EIA) in transport planning	Largely adopted	3
Citizen communication instruments (such as citizens' forums and public representatives in the city council) for public participation in transport planning	Limitedly adopted	1
Horizontal communication instruments (such as communication channels, IT technologies, overarching goals, merger of intra-departments, partnerships) across departments for transport planning	Partially adopted	2
A local Sustainable Urban Transport Plan (SUTP), in accordance with the designing principles provided by the European Commission's Thematic Strategy on the Urban Environment.	Partially adopted	2
Integrated appraisal and assessments methods in transport planning, like Strategic Environmental Assessment (SEA).	Largely adopted	3
Vertical communication instruments (such as discussion forums and reporting channels) between local governments (e.g. municipalities) and higher government layers (e.g. regional and/or provincial governments) for transport planning.	Largely adopted	3
The existence of NGOs or civil society groups collaborating with local governments in transportation issues.	Largely adopted	3
Competitive tendering contracts or other mechanisms to foster competition of transport services	Largely adopted	3
The existence of a voluntary environmental compliance agreements, label or code of conduct adopted by public transport operators	Nonexistent	0
Strategies to increase public authorities skills in environmental , land-use and transport integrative planning (e.g. joining city networks, promoting job rotation among departments; conducting workshops; joining expertise urban planners networks)	Nonexistent	0
The usage of Environmental performance indicators when awarding a transport service to a subcontractor	Largely adopted	3
An independent authority responsible for identifying, steering and managing the cross-cutting issues of environmental, land-use and transport planning	Limitedly adopted	1
The existence of a shared budget for integrative transport planning.	Largely adopted	3
Average Coordination Mechanisms in Toulouse	**NA**	**2,142857143**
2,142 = 30/ 14		

Annex VII - Annexes of survey analysis

Figure 1 – Spearman Rho correlation test between CMEPI, EFUPTM, and car share

Correlations

			EFUPTM_ adoption	CMEPI
Spearman's rho	EFUPTM_adoption	Correlation Coefficient	1,000	,690**
		Sig. (2-tailed)	.	,000
		N	31	31
	CMEPI	Correlation Coefficient	,690**	1,000
		Sig. (2-tailed)	,000	.
		N	31	31

**. Correlation is significant at the 0.01 level (2-tailed).

Correlations

			EFUPTM_ effectiveness	CMEPI
Spearman's rho	EFUPTM_effectiveness	Correlation Coefficient	1,000	,280
		Sig. (2-tailed)	.	,134
		N	37	30
	CMEPI	Correlation Coefficient	,280	1,000
		Sig. (2-tailed)	,134	.
		N	30	31

Correlations

			Modal_ share_car	CMEPI
Spearman's rho	Modal_share_car	Correlation Coefficient	1,000	-,236
		Sig. (2-tailed)	.	,218
		N	36	29
	CMEPI	Correlation Coefficient	-,236	1,000
		Sig. (2-tailed)	,218	.
		N	29	31

Figure 2 – Spearman Rho correlation test between EFUPTM and exogenous variables

Correlations

			EFUPTM adoption	Frequency exogenous variables
Spearman's rho	EFUPTM adoption	Correlation Coefficient	1,000	-,517**
		Sig. (2-tailed)	.	,003
		N	31	30
	Frequency exogenous variables	Correlation Coefficient	-,517**	1,000
		Sig. (2-tailed)	,003	.
		N	30	30

**. Correlation is significant at the 0.01 level (2-tailed).

Figure 3 – Boxplot of exogenous variables for EFUPTM

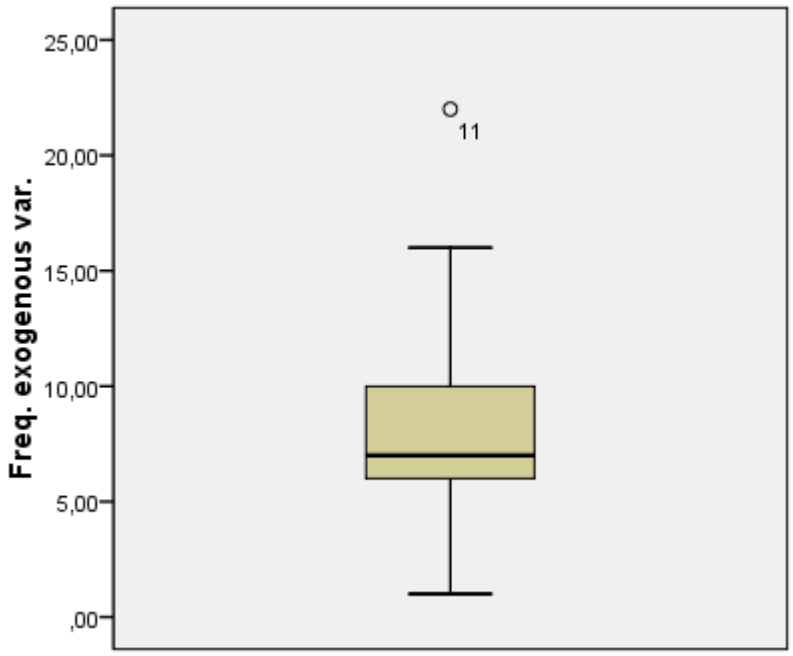


Figure 4 – Frequency of barriers to policy implementation

Freq, exogenous var.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1,00	1	2,6	3,3	3,3
	2,00	1	2,6	3,3	6,7
	3,00	2	5,1	6,7	13,3
	4,00	1	2,6	3,3	16,7
	5,00	2	5,1	6,7	23,3
	6,00	6	15,4	20,0	43,3
	7,00	4	10,3	13,3	56,7
	8,00	3	7,7	10,0	66,7
	9,00	2	5,1	6,7	73,3
	10,00	3	7,7	10,0	83,3
	12,00	2	5,1	6,7	90,0
	15,00	1	2,6	3,3	93,3
	16,00	1	2,6	3,3	96,7
	22,00	1	2,6	3,3	100,0
	Total	30	76,9	100,0	
Missing	System	9	23,1		
Total		39	100,0		

Figure 5 – Correlation between EFUPTM and groups of cases with lower (<= 6) and higher (> 6) frequency of exogenous variables.

Correlations - Freq. exogenous var. <=6

			EFUPTM adoption	Freq. exogenous var. <=6
Spearman's rho	EFUPTM adoption	Correlation Coefficient	1,000	-,304
		Sig. (2-tailed)	.	,312
		N	13	13
	Freq. exogenous var. <=6	Correlation Coefficient	-,304	1,000
		Sig. (2-tailed)	,312	.
		N	13	13

Correlations - Freq. exogenous var. >6

			EFUPTM adoption	Freq. exogenous var. >6
Spearman's rho	EFUPTM adoption	Correlation Coefficient	1,000	-,096
		Sig. (2-tailed)	.	,725
		N	16	16
	Freq. exogenous var. >6	Correlation Coefficient	-,096	1,000
		Sig. (2-tailed)	,725	.
		N	16	16

Figure 6 – Mann-Whitney U test for EFUPTM across the two groups of different exogenous factors (> = 7 and < = 6)

Ranks

	Barriers_group	N	Mean Rank	Sum of Ranks
EFUPTM adoption	<= 6 exogenous factors	13	19,31	251,00
	>= 7 exogeous factors	16	11,50	184,00
	Total	29		

Test Statistics[b]

	Average_ Policies
Mann-Whitney U	48,000
Wilcoxon W	184,000
Z	-2,458
Asymp. Sig. (2-tailed)	,014
Exact Sig. [2*(1-tailed Sig.)]	,013[a]

a. Not corrected for ties.

b. Grouping Variable: Barriers_group

Figure 7 – Correlation between CMEPI and adoption of EFUPTM for the two groups with different values of exogenous variables.

Correlations - Cases whose freq. of exogenous variables > 6

			EFUPTM adoption	CMEPI
Spearman's rho	EFUPTM adoption	Correlation Coefficient	1,000	,795**
		Sig. (2-tailed)	.	,000
		N	16	16
	CMEPI	Correlation Coefficient	,795**	1,000
		Sig. (2-tailed)	,000	.
		N	16	16

**. Correlation is significant at the 0.01 level (2-tailed).

Correlations - Cases whose freq. of exogenous variables <= 6

			EFUPTM adoption	CMEPI
Spearman's rho	EFUPTM adoption	Correlation Coefficient	1,000	,361
		Sig. (2-tailed)	.	,225
		N	13	13
	CMEPI	Correlation Coefficient	,361	1,000
		Sig. (2-tailed)	,225	.
		N	13	13

Figure 8 – Kruskal Wallis Test between the nature of coordination and CMEPI adoption

Ranks

	Nature_of_coordinantion	N	Mean Rank
Average_Coord	Fully hierarchical	2	7,00
	More hierarchical than cooperative	5	11,40
	Partially hierarchical and cooperative	11	14,41
	More cooperative than hierarchical	7	20,86
	Fully cooperative	3	10,17
	Total	28	

Test Statistics[a,b]

	Average_Coord
Chi-Square	7,395
df	4
Asymp. Sig.	,116

a. Kruskal Wallis Test

b. Grouping Variable: Nature_of_coordinantion

Ranks

	Nature_of_coordinantion	N	Mean Rank
Green_Vol_Coord	Fully hierarchical	2	4,25
	More hierarchical than cooperative	5	9,80
	Partially hierarchical and cooperative	11	16,86
	More cooperative than hierarchical	7	19,07
	Fully cooperative	3	9,83
	Total	28	

Test Statistics[a,b]

	Green_Vol_Coord
Chi-Square	8,812
df	4
Asymp. Sig.	,066

a. Kruskal Wallis Test

b. Grouping Variable: Nature_of_coordinantion

Figure 9 – Correlation between CMEPI and GDP per capita.

Correlations

			CMEPI	National GDP per capita
Spearman's rho	CMEPI	Correlation Coefficient	1,000	,571**
		Sig. (2-tailed)	.	,001
		N	31	31
	National GDP per capita	Correlation Coefficient	,571**	1,000
		Sig. (2-tailed)	,001	.
		N	31	39

**. Correlation is significant at the 0.01 level (2-tailed).

References

Aalberts, T. 2002 “Multilevel Governance and the Future of Sovereignty: A Constructivist Perspective” *Working Papers Political Science* No.04/2002 pp.1-26. Retrieved December, 15, 2011 from http://dare.ubvu.vu.nl/bitstream/1871/10692/1/1AC46EF4-EF25-40F2-9CD7DDA1ED704837.pdf

Barton, H. 2009, "Land use planning and health and well-being", *Land Use Policy,* vol. 26, Supplement 1, no. 0, pp. S115-S123

Beattie, C.I., Longhurst, J.W.S. & Elsom, D.M. 2004, "Evidence of integration of air quality management in the decision-making processes and procedures of English local government", *Local Environment,* vol. 9, no. 3, pp. 255-270

Bekken J., Longva, F., Fearnley, N.,T& Osland,O., 2006, "Norwegian experience with tendered buss services*", European Transport*, No 33, pp 29-40

Betsill, M.M. & Bulkeley, H. 2006, "Cities and the multilevel governance of global climate change", *Global Governance,* vol. 12, no. 2, pp. 141-159.

Betsill, M.M. & Bulkeley, 2005, "Rethinking sustainable cities: Multilevel governance and the 'urban' politics of climate change", *Environmental Politics,* vol. 14, no. 1, pp. 42-63

Bish, R. 2001, "Local Government Amalgamations: Discredited Nineteenth-Century Ideals Alive in the Twenty-First". *The Urban Papers,* C. D. Howe Institute, Toronto

Boyne, G. 1992, “Local Government Structure and Performance: Lessons from America” *Public Administration*, 70, pp. 333-357

Colantonio, A. 2008, “Traditional and Emerging Prospects in Social Sustainability”, *Oxford Institute for Sustainable Development (OISD) and European Investment Bank (EIB)*, WP 2008/11 Retrieved October 10, 2010 from http://oisd.brookes.ac.uk/sustainable_communities/resources/SocialSustainabilityProspectspaper.pdf

EC, European Commission, 2000, Cost 332 Transport and Land Use policies: Innovations in Institutional Arrangements for Co-ordination. Luxembourg: Office for Official Publications of the European Communities. Retrieved October 09, 2011 ftp://ftp.cordis.europa.eu/pub/cost-transport/docs/332-en.pdf

EC, European Commission, 2007, *Preparatory Document in relation to the follow-up of the Thematic Strategy on the Urban Environment*. Office for Official Publications of the European Communities Retrieved November 15, 2011, from http://ec.europa.eu/environment/urban/pdf/transport/2007_sutp_prepdoc.pdf

EC, Eu http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52009DC0490:EN:NOTropean Commission, 2009, *Action Plan on Urban Mobility*, Retrieved July 15, 2011, from http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52009DC0490:EN:NOT

European Commission Directorate General Transport, 1996, *Transport and Land-use Policies : Resistance and Hopes for Coordination*. Proceedings of the Launching Seminar of the Action COST 332 24-25 October 1996. Barcelona, Spain.

ECMT, European Conference of Ministers of Transport, 2000, *Sustainable transport policies.* Paris, OECD

ECMT, European Conference of Ministers of Transport, 2001 *Implementing Sustainable Urban Travel Policies - National Peer Review of the Netherlands* . Paris, OECD. Retrieved August 15, 2011, from http://internationaltransportforum.org/pub/pdf/01UrbNL.pdf

ECMT, European Conference of Ministers of Transport, 2002, *Implementing sustainable urban travel policies.* Paris, OECD. Retrieved July 15, 2011, from http://internationaltransportforum.org/pub/pdf/02UrbFinal.pdf

ECMT, European Conference of Ministers of Transport, 2006, Sustainable urban travel: implementing sustainable urban travel policies: applying the 2001 key messages . Paris, Retrieved July 15, 2011, http://www.internationaltransportforum.org/IntOrg/ecmt/urban/pdf/CM200603Fe.pdf

EEA, European Environmental Agency 2005. Environmental Policy Integration in Europe: State of Play and an Evaluative Framework, Technical Report, No 2/2005, Copenhagen: European Environment Agency

EEA, Europe Environmental Agency, 2011, *Europe's environment - An Assessment of Assessments – 3 Green Economy*. 2011 Environment for Europe' Ministerial Conference in Astana, Retrived January 21, 2012 from: http://www.eea.europa.eu/publications/europes-environment-aoa

English, J. & Spear, J. 2009, "Reviewing transport governance: The case of Leeds, UK", *Proceedings of the Institution of Civil Engineers: Municipal Engineer,* vol. 162, no. 3, pp. 141-148

Environment DG, 2005, *Sustainable Urban Transport Plans (SUTP) and urban environment: Policies, effects, and simulations.* Retrieved November 06, 2011, http://ec.europa.eu/environment/urban/pdf/sutp.pdf

ESDN, European Sustainable Development Network, 2009, *Horizontal Policy Integration and Sustainable Development: Conceptual remarks and governance examples*. Retrieved November 05, 2011, http://www.sd-network.eu/?k=quarterly%20reports&report_id=13

Expert Group on the Urban Environment, 1996 *European Sustainable Cities,* European Commission, DGXI Environment, Nuclear Safety and Civil Protection Brussels. Retrieved August 15, 2011, http://ec.europa.eu/environment/urban/pdf/rport-en.pdf

Falkner, R. 2003, "Private Environmental Governance and International Relations: Exploring the Links", *Global environmental politics*, Volume: 3, Issue: 2 (June 24, 2003), pp: 72-87

Fang Zhao, Min-Tang Li, Lee-Fang Chow, Albert Gan, L.David Sheen, 2002, *FSUTMS Mode Choice Modelling: Factors Affecting Transit Use and Access*, National Centre For Transit Research (NCTR) and Lehamn Centre for Transportation Research. Retrieved November 11, 2010: http://www.dot.state.fl.us/research-center/Completed_Proj/Summary_PTO/FDOT_BC137_07_rpt.pdf

Feldman, E., nd, "Governance, development and polycentrism: Towards the promotion of European decentralised cooperation" Observatorio de la Cooperación Descentralizada Retrieved December 2, 2011 from http://www.observ-ocd.org/temp/libreria-158.pdf

Feiock, R., 2008, "Institutional Collective Action and Local Government Collaboration," Chapter 10 in O'Leary & Bingham, L., (eds), *Big Ideas in Collaborative Public Management*, Rosemary. M.E. Sharpe Press

Feiock, R.C., Lee, I.W., Park, H.J. & Lee, K. 2010, "Collaboration networks among local elected officials: Information, commitment, and risk aversion", *Urban Affairs Review,* vol. 46, no. 2, pp. 241-262.

Feiock, R.C., Steinacker, A. & Park, H.J. 2009, "Institutional collective action and economic development joint ventures", *Public administration review,* vol. 69, no. 2, pp. 256-270

Frederickson, H. & Smith, K. 2003, *The Public Administration Theory Primer*, Boulder, Colorado, Westview Press. 279 pp

Forrester, J., & Snell, C. 2007, *Understanding the Structure of Institutions Responsible for the Delivery for Sustainable Urban Transport*. *DISTILLATE Formal Deliverable* D2, Retrived 15 September 2011 from: http://www.distillate.ac.uk/outputs/Project%20D%20Structures.pdf

Gärling, T. & G. Schuitema. 2007, "Travel demand management targeting reduced private car use: Effectiveness, public acceptability and political feasibility" *Journal of Social Issues* 63(1), pp.139-153.

Geerlings, H., & Stead, D., 2003, "The integration of land use planning, transport and environment in European policy and research", *Transport Policy*, vol. 10, no. 3, pp. 187-196

Geerlings, H., & Sluis-van Meijeren, M van der., 2008, "The dominance of the Lisbon agreement as a barrier for an environmentally oriented transport policy in Europe : the gap between theory and implementation in policy integration" *Transportation Research Board,* Number 39 p. 14-32

Grijp, N., Biermann, F. & Davies, O. 2009 "Environmental policy integration and the architecture of global environmental governance" *International environmental agreements*, Volume: 9, Issue: 4 pp: 351-369

Herodes M., Adelle C., & Pallemaerts M. 2007, "Environmental Policy Integration and Modes of Governance – A literature review" *EPIGOV Paper* No.3, Ecologic – Institute for International and European Environmental Policy, IEEP, Berlin

Hawkins, C.V. 2010, "Competition and Cooperation: Local Government Joint Ventures for Economic Development", *Journal of Urban Affairs,* vol. 32, no. 2, pp. 253-275.

Hawkins, C.V. & Feiock, R. 2011, "Joint ventures, economic development policy, and the role of local governing institutions", *American Review of Public* Administration, vol. 41, no. 3, pp. 329-347

Hawkins, C.V. & Andrew, S.A. 2011, "Understanding horizontal and vertical relations in the context of economic development joint venture agreements", *Urban Affairs Review,* vol. 47, no. 3, pp. 385-412

Hey, C. 2002. "Why does environmental policy integration fail? The case of environmental taxation for heavy goods vehicles". In A. Lenschow (eds) *Environmental policy integration: Greening sectoral policies in Europe*. London: Earthscan. pp. 120-135

Herrera, R. 2010, “The Contribution of Strategic Environmental Assessment to Transport Policy Governance” pp. 483–519 in OECD, *The Future for Interurban Passenger Transport: Bringing Citizens Closer Together* ITF, International Transport Forum, Retrieved 12 January 2012 from http://www.keepeek.com/Digital-Asset-Management/oecd/transport/the-future-for-interurban-passenger-transport_9789282102688-en

Hertin J., Berkhout F., 2003 "Analysing institutional strategies for environmental policy integration: the case of EU enterprise policy". *Journal of Environmental Policy and Planning* Volume 5 Issue 1, 39–56

Hooghe, L., & G. Marks. 2003. "Unraveling the central state, but how? Types of multi-level governance" *The American Political Science Review* 97(2):233-243.

Hogl, K. 2002, Reflections on Inter-Sectoral Coordination in National Forest Programmes. In: Tikkanen, I., Glück, P., Pajuoja, H. (Eds.): Cross-Sectoral Policy Impacts on Forests, 4-6 April 2002, Paviljonki, Savonlinna, Finland; EFI Proceedings, 46, 75-90, European Forest Institute, Joensuu, Finland. Retrieved October 9, 2011, from: http://www.erlingberge.no/COST19%202002%20Savonlinna%20proc46_net.pdf#page=75

Hull, A. 2005, "Integrated transport planning in the UK: From concept to reality", *Journal of Transport Geography*, vol. 13, no. 4, pp. 318-328.

Hull, A. 2008, "Policy integration: What will it take to achieve more sustainable transport solutions in cities?" *Transport Policy*, vol. 15, no. 2, pp. 94-103.

Hull, A. 2009, "Implementing innovatory transport measures: What local authorities in the UK say about their problems and requirements", *European Journal of Transport and Infrastructure Research,* vol. 9, no. 3, pp. 202-218.

Hull, A., Tricker, R., Hills, S. 2006, *Interactions between policy sectors and constraints on cross-sector working in the delivery of Sustainable Urban Transport Solutions, DISTILLATE Formal Deliverable* A2, Retrived 15 September 2011 from: http://www.distillate.ac.uk/outputs/A2report_020806.pdf

ICLEI, Local Governments for Sustainability, 2003, *Improving Environmental and Social Standards in Urban Public Transport through Competitive Tendering*: *A Good Practice Guide* ,ICLEI European Secretariat, Freiburg. Retrieved November 18, 2010 from http://www.managenergy.net/download/GP_Guide_SIPTRAM.pdf

Ison, S., Rye, T. (ed.) 2008, *The Implementation and Effectiveness of Transport Demand Management Measures*. Burlington : Ashgate. 2008

Jordan, A. 1999, "Editorial introduction: The construction of a multilevel environmental governance system", *Environment and Planning C: Government and Policy,* vol. 17, no. 1, pp. 1-17.

Kwon, S. & Feiock, R.C. 2010, "Overcoming the Barriers to Cooperation: Intergovernmental Service Agreements", *Public administration review,* vol. 70, no. 6, pp. 876-884.

Jakobsson, C., Fujii, S. & Gärling, T. 2000, "Determinants of private car users' acceptance of road pricing", *Transport Policy,* vol. 7, no. 2, pp. 153-158

Jessop, B. 1998, "The rise of governance and the risks of failure: The case of economic development", *International Social Science Journal,* vol. 50, no. 155, pp. 44-45.

Jen, W., & Hu, K.-C., 2003, “Application of perceived value model to identify factors affecting passengers' repurchase intentions on city bus: A case of the Taipei metropolitan area”. *Transportation 30 (3)*, pp. 307-327

Jordan, A. & Russel, D. 2007: "The Struggle against Departmentalism: the Integration of the Environment into United Kingdom Policy Making", EPIGOV Papers No. 19, Ecologic – Institute for International and European Environmental Policy: Berlin.

Jordan, A., Wurzel, R.K.W. & Zito, A.R. 2003, "New' environmental policy instruments: An evolution or a revolution in environmental policy?” *Environmental Politics,* vol. 12, no. 1, pp. 201-224.

Jouve, B. 2008, "Urban governance: Towards the emergence of a new policy instrument?", *International Social Science Journal,* vol. 59, no. 193-194, pp. 343-357.

Kettl, D.2002 *The Transformation of Governance: Public administration for the twenty-first century America*. Baltimore and London: Johns Hopkins University Press, 205 pp

Kenworthy, J.R. & Laube, F.B. 1999, "Patterns of automobile dependence in cities: An international overview of key physical and economic dimensions with some implications for urban policy", *Transportation Research Part A: Policy and Practice,* vol. 33, no. 7-8, pp. 691-723

Lafferty, W.M. & Hovden, E. 2003, "Environmental policy integration: Towards an analytical framework", *Environmental Politics,* vol. 12, no. 3, pp. 1-22.

Lautso K., Spiekermann K., Wegener M., Sheppard I., Steadman P., Martino A., Domingo R. & Gayda S. 2004 PROPOLIS - Planning and Research of Policies for Land Use and Transport for Increasing Urban Sustainability. Final report. Helsinki, LT Consultants. Retrived 15 September 2011 from: http://www.ltcon.fi/propolis/propolis_final_report.pdf

Lenschow A., 1997, ``Variation in EC environmental policy integration: agency push within complex institutional structures'' *Journal of European Public Policy* 4, pp. 109-127

Lenschow, A. 2002a, Environmental policy integration: Greening sectoral policies in Europe. London - Earthscan Publications

Lenschow, A. 2002b, "New Regulatory Approaches in ‘Greening’ EU Policies", *European Law Journal*, vol. 8, no. 1, pp. 19

Lenschow, A. 2007 "The modes of EPI in theory and practice" *Ecologic – Institute for International and European Environmental Policy, EPIGOV Paper No. 10,* Berlin, February 2007

Lemos, M. C., & A. Agrawal. 2006. "Environmental governance". *Annual Review of Environment and Natural Resources* 31(3):1–29

Lowery, D. 2001, "Metropolitan Governance Structures from a Neo-progressive Perspective" *Swiss Political Science Review*, pp-1-12

Lowndes , V., & Skelcher C., 1998, "The dynamics of multi-organizational partnerships: An analysis of changing modes of governance" *Public Administration* 76. pp. 313-333

May, A.D. & Roberts, M. 1995, "The design of integrated transport strategies", *Transport Policy,* vol. 2, no. 2, pp. 97-105

May, A.D., Kelly, C. & Shepherd, S. 2006, "The principles of integration in urban transport strategies", *Transport Policy*, vol. 13, no. 4, pp. 319-327

May, A. & Marsden, G. 2010, *Urban Transport and Mobility*, International Transport Forum 2010, Transport and Innovation: Unleashing the Potential, 26-28 May, Leipzig, Germany Retrieved July,15,2011 from www.internationaltransportforum.org/Pub/pdf/10FP05.pdf

McGinnis, M., 2005, "Costs and Challenges of Polycentric Governance", *Workshop on Analyzing Problems of Polycentric Governance in the Growing EU*, Humboldt University, Berlin, June 2005, Retrieved November 22, 2011 from www.indiana.edu/~workshop/papers/mcginnis_berlin.pdf

Meijers, E. & Stead, D. 2004, "Policy Integration: What Does It Mean and How Can it be Achieved? A Multi-Disciplinary Review" *Berlin Conference on the Human Dimensions of Global Environmental Change: Greening of Policies - Interlinkages and Policy Integration*. 2004. Retrieved July 27, 2011, from http://userpage.fu-berlin.de/ffu/akumwelt/bc2004/download/meijers_stead_f.pdf

Mickwitz, P. & Kivimaa, P. 2007, "Evaluating policy integration: The case of policies for environmentally friendlier technological innovations", *Evaluation,* vol. 13, no. 1, pp. 68-86.

Meadowcroft, J. 2007, "Who is in charge here? Governance for sustainable development in a complex world", *Journal of Environmental Policy and Planning,* vol. 9, no. 3-4, pp. 299-314.

MDL, McKinlay Douglas Limited, 2006, Local Government Structure and Efficiency - A report prepared for Local Government New Zealand, October 2006 Retrieved November 22, 2011 http://www.lgnz.co.nz/library/files/store_015/LocalGovernmentStructureandEfficiencyReport.pdf

Nilsson, M., Eklund, M. & Tyskeng, S. 2009, "Environmental integration and policy implementation: Competing governance modes in waste management decision making", *Environment and Planning C: Government and Policy,* vol. 27, no. 1, pp. 1-18

Nykvist, B. 2008: "EPI in Multi-Level Governance – A Literature Review", EPIGOV Papers No. 3, Ecologic – Institute for International and European Environmental Policy: Berlin

OECD, 2001a, *Policies to enhance sustainable development* OECD, Paris

OECD, 2001b, *Sustainable development: critical issues*. OECD, Paris.

OECD, 2002, Governance for Sustainable Development: Five OECD Case Studies, OECD, Paris, France.

OECD 2008, *Privatisation and regulation of urban transit systems*, ITF, International Transport Forum, Round Tables 141, 05 Nov 2008 Retrieved November 23, 2011 http://www.oecdbookshop.org/oecd/display.asp?K=5KZDH0J9P89S&LANG=EN

OECD 2011, *Better Economic Regulation: The role of the regulator*, ITF, International Transport Forum, Discussion paper 03, 17 May 2011 Retrieved November 23, 2011 http://www.internationaltransportforum.org/jtrc/DiscussionPapers/DP201103.pdf

OPTIC, Optimal Policies for Transport in Combination, 2011a, *Best practices and recommendations on policy packaging*,Deliverable 6, August 2011 Retrieved November 05, 2011 http://optic.toi.no/getfile.php/Optic/Bilder%20og%20dokumenter%20internett/OPTIC%20D5%20Final.pdf

Ostrom, E. 1972, "Metropolitan Reform: Propositions Derived from Two Traditions", Social Science Quarterly 53 (4), pp. 474-493

Ostrom, E., 2005, *Understanding institutional diversity*. Oxford: Princeton University Press

Ostrom, E., Parks, R, & Whitaker, G. 1978, *Patterns of Metropolitan Policing*, Cambridge

Ostrom, E., & Parks, R. 1999, "Neither Gargantua nor the Land of Lilliputs: Conjectures on Mixed Systems of Metropolitan Organization," in Michael McGinnis (eds), *Polycentricity and Local Public Economies: Readings from the Workshop in Political Theory and Policy Analysis*, Ann Arbor: University of Michigan Press, pp. 284–305.

Ostrom, E. 2010, "Beyond markets and states: Polycentric governance of complex economic systems", *American Economic Review,* vol. 100, no. 3, pp. 641-672.

Ostrom, V., Tiebout, C., & Warren, R. 1961, "The Organization of Government in Metropolitan Areas: A Theoretical Inquiry." *American Political Science Review* vol. 55, no. 4, pp. 831-842

Parks, R., 1985, "Metropolitan Structure and Systemic Performance: The Case of Police Service Delivery," in Hanf, K., & Toonen, T., (eds), *Policy Implementation in Federal and Unitary States*, 1985, pp. 161-191

Partidário, M. 2010, "Does Strategic Environmental Assessment Change Outcomes? pp. 521–540 in OECD The Future for Interurban Passenger Transport: Bringing Citizens Closer Together Retrieved 12 January 2012 from http://www.keepeek.com/Digital-Asset-Management/oecd/transport/the-future-for-interurban-passenger-transport_9789282102688-en

Persson, A., 2002, *"Different Perspectives on EPI".* In A. Lenschow (eds) Environmental policy integration: Greening sectoral policies in Europe. London: Earthscan. pp. 25-48

Persson, A. 2004, *Environmental Policy Integration: An Introduction*. Background Paper: Project on 'Policy Integration for Sustainability (PINTS). Stockholm: Stockholm Environment Institute. Retrieved September 23, 2011, from http://sei-international.org/mediamanager/documents/Publications/Policy-institutions/EPI.pdf

Pestana, M., & Gageiro, J. 2009. *Análise categórica, árvores de decisão e análise de conteúdo: Em ciências sociais e da saúde com o SPSS*. Lisboa: Lidel, 350 pp.

Peters, G., 1998, "Managing horizontal government: The politics of coordination." *Research Paper No. 21*. Ottawa: Canadian Centre for Management Development.

Pisani, J.A., & Sandham, L.A., 2006 "Assessing the performance of SIA in the EIA context: A case study of South Africa", Environmental Impact Assessment Review 26 (8), pp. 707-724

Power, A. & William Julius, W. 2000, “Social exclusion and the future of cities”, *CASEpaper, 35,* Centre for Analysis of Social Exclusion, London School of Economics and Political Science, London, UK.

PRB, 2011, *World Population Data Sheet* Retrieved May 18, 2012 from: http://www.prb.org/pdf11/2011population-data-sheet_eng.pdf

Rametsteiner, E., Bauer, A & Weiss, G., 2010 "Policy Integration and Coordination: Theoretical, Methodical and Conceptual Approach" in: Rametsteiner, E., Weiss, G., Ollonqvist, P. & Slee, B. (eds), *Policy Integration and Coordination: the Case of Innovation and the Forest Sector in Europe, OPOCE, Brussels pp. 1-10 Retrieved September 1, 2011, http://www.cost.esf.org/library/publications/10-15-Policy-Integration-and-Coordination-the-Case-of-Innovation-and-the-Forest-Sector-in-Europe*

Racca, D., & Ratledge, E., 2004, ""Factors That Affect and/or Can Alter Mode Choice".CADSR Transportation, University of Delaware, Retrieved August 11, 2011 from http://dspace.udel.edu:8080/dspace/bitstream/handle/19716/1101/transitmodel.pdf?sequence=1

Rayner, J. & Howlett, M. 2009, "Conclusion: Governance arrangements and policy capacity for policy integration", *Policy and Society,* vol. 28, no. 2, pp. 165-172

Sager, F. 2006, "Policy coordination in the European metropolis: A meta-analysis", *West European Politics,* vol. 29, no. 3, pp. 433-460.

Santos, G., Behrendt, H. & Teytelboym, A. 2010 "Part II: Policy instruments for sustainable road transport." *Research in Transportation Economics*, 28(1): 46-91.

Santos, G. & von Brunn, T., 2011, "Factors influencing modal split of commuting journeys in 34 medium-sized European cities", European Regional Science Association, ERSA conference papers Retrieved January 25, 2012 from http://www-sre.wu.ac.at/ersa/ersaconfs/ersa11/e110830aFinal01019.pdf

Stead, D. 2008, "Institutional aspects of integrating transport, environment and health policies", *Transport Policy*, vol. 15, no. 3, pp. 139-148

Stead, D. & Geerlings, H. 2005, "Integrating transport, land use planning and environment policy. Views of practitioners from Denmark, England and Germany", *Innovation,* vol. 18, no. 4, pp. 443-453

Salamon, M. (ed.), 2002 *The Tools of Government: A Guide to the New Governance* New York: Oxford University Press 669 pp.

Stoker, G. 1998, “Governance as theory: five propositions”. *International Social Science Journal* 50(1):17-28.

Simeonova, V. & van der Valk, A. 2009, "The need for a communicative approach to improve environmental policy integration in urban land use planning", *Journal of Planning Literature,* vol. 23, no. 3, pp. 241-261.

Te Brömmelstroet, M. & Bertolini, L. 2010, "Integrating land use and transport knowledge in strategy-making", *Transportation,* vol. 37, no. 1, pp. 85-104

Tews, K., Busch, P. & Jörgens, H. 2003, "The diffusion of new environmental policy instruments", *European Journal of Political Research,* vol. 42, no. 4, pp. 569-600

Tiebout, C., 1956, "A Pure Theory of Local Expenditures", Journal of Political Economy 64 (4), pp. 416-424

Toonen, T. 2010, "Resilience in public administration: The work of elinor and vincent Ostrom from a public administration perspective", *Public administration review,* vol. 70, no. 2, pp. 193-202.

TRANSPLUS 2003, *Achieving Sustainable Transport and Land Use with Integrated Policies*, Final Project Report, Retrieved July 15, 2011, from http://www.transplus.net/TrDoc/T_inglese.pdf

TRL, Transport Research Labratory (eds), 2004, The demand for public transport: A practical guide. TRL Report TRL 593, UK. Retrieved 12 November, 2010: http://www.demandforpublictransport.co.uk/TRL593.pdf

UNECE, United Nations Economic Comission For Europe, 2008, *Working together for Sustainable and Healthy Transport: Guidance on Supportive Institutional Conditions for Policy Integration of Transport, Health and Environment*. World Helath Organization, Regional Office for Europe, ECE/AC.21/1 Retrieved September 1, 2011, from: *http://www.unece.org/fileadmin/DAM/thepep/en/publications/WorkingTogether.Guidance.en.pdf*

Verhoest, K., Peters, G., Beuselinck, E., Meyers, F., & Bouckaert, G. 2004, *How Coordination and Control of Public Organizations by Government Interrelate: an analytical and empirical exploration*. Retrieved November 5, 2011 from http://soc.kuleuven.be/io/pubpdf/io02060016_coordination_scancor.pdf

Viegas , J.M. 2005, "Transport and governance: Co-decision and power sharing" in Macário R., J.M. Viegas,. Hensher. D.A, (ed.) 2006, *Competition and Ownership in Land Passenger Transport Selected Papers from the 9th International Conference* (Thredbo 9), Lisbon, September 2005. Elsevier/Emerald. pp 35 – 48

Vieira, J., Moura, F., & Viegas Manuel , J. 2007, "Transport policy and environmental impacts: The importance of multi-instrumentality in policy integration", *Transport Policy,* vol. 14, no. 5, pp. 421-432.

Volkery, A., 2003. Instruments for Policy Integration: Inter-mediate Report of the RIW Project POINT. Environmental Policy Research Centre, Berlin. Retrieved July 15, 2011 from http://www.polsoz.fu-berlin.de/polwiss/forschung/systeme/ffu/publikationen/2003/jacob_klaus_volkery_axel_2003/rep_2003-06.pdf

Watson, M., Bulkeley, H. & Hudson, R. 2008, "Unpicking environmental policy integration with tales from waste management", *Environment and Planning C: Government and Policy,* vol. 26, no. 3, pp. 481-498.

Wagner, R.E. 2005, "Self-governance, polycentrism, and federalism: Recurring themes in Vincent Ostrom's scholarly oeuvre", *Journal of Economic Behavior and Organization,* vol. 57, no. 2, pp. 173-188.

WCED, World Commission on Environment and Development, 1987. Our common future. Oxford: Oxford University Press. Retrieved November 05, 2011 http://upload.wikimedia.org/wikisource/en/d/d7/Our-common-future.pdf