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Urban Sustainability and Sustainable Mobility

Papers from the 8.Nordic Environmental Social Science Research Conference June 18-20 2007. Workshop 2 and 3

Working Paper
2007:113

Title:	**Urban Sustainability and Sustainable Mobility** Papers from the 8. Nordic Environmental Social Science Research Conference, June 18-20 2007. Workshop 2 and 3.
Editors:	Inger Balberg and Hege Hofstad
Working Paper:	2007:113
ISSN: ISBN:	0801-1702 978-82-7071-689-0
Project number: Project name::	O-2513 NESS conference
Financial supporter	Norwegian Institute for Urban and Regional Research
Head of project:	Hege Hofstad

Abstract: Sustainable development is a concept few would disagree with at a general level, but is contested when put into actual practice. How is sustainable urban development discussed, defended and even coopted by actors in urban development? What is the actual urban development compared with the ideal? How useful are models and ideals in environmental policy-making? Urban governance in the Nordic countries has been marked by deregulation, privatisation and market solution. At the same time ecosystem management and the need for cross-sectoral and cross-boundary institutions have been underlined. What are the challenges, constraints and opportunities following from these trends in urban regions? New technology and urbanisation (both in terms of land-use and life-style) represent transport changing drivers with possibly environmentally friendly consequences. A new societal and political preoccupation with climate, energy and health issues might promote a more sustainable mobility pattern. However, the 'sustainable mobility' conceptualisation demands integrative policy measures and analytical planning tools to grasp – and communicate - the relationships and reduce the sustainable mobility complexity - across its causes, changes and consequences. The papers discuss the challenges, constraints and opportunities following from trends in urban regions and various societal (economic, political, social and cultural) drivers as important "policy and planning" challenges for a more sustainable mobility.

Date:	October 2007
Pages:	73
Publisher:	Norwegian Institute for Urban and Regional Research Guastadalléen 21, Box 44, Blindern N-0313 OSLO Telephone (+47) 22 95 88 00 Telefax (+47) 22 60 77 74 E-mail: nibr@nibr.no http://www.nibr.no Org. nr. NO 970205284 MVA

Foreword

The biannual NESS Research Conferences have become a valued tradition. From a relatively humble beginning in the early 1990's, these conferences have grown to become truly international events. The Nordic region shares democratic and social values and at the same time has, to a large extent, the same environmental challenges.

In 2007, it is twenty years since the Brundtland-commission came with the report "Our common future". They launched the most common definition of sustainable development and, as a consequence, gave the global perspective in environmental policy its absolute breakthrough.

Twenty years later, this perspective has become even more relevant. Nature consists of common-pool resources, and environmental problems are border crossing. The 8th NESS conference in Oslo, Norway June 18-20.looked into how the international community, nations and local communities meet common challenges on the environmental area. Furthermore, we discussed how the internationalisation of environmental politics creates challenges, constraints and opportunities on the local, national and global level.

These themes provided a good starting point for interesting discussions and new acquaintances. The conference gathered approximately 80 researchers from the Nordic countries, the Netherlands and Germany. In addition there were four keynote speakers: Arild Underdal, Susan Baker, Terry Marsden and Jan Erling Klausen. In this compendium you will find some of the papers presented at the conference. Of different reasons, some of the participants wanted to abstain from the proceedings.

Oslo, October 2007

Berit Nordahl

Research Director

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Biofuels for sustainable mobility – the challenges of multi level governance

By Annica Kronsell and Lorenzo Di Lucia

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Abstract

In this paper we subscribe to the notion that the use of liquid fuels made from biomass constitute a change towards a more sustainable transport sector in the EU, though probably only a small and incremental change. The EU has recognized the potential of biofuels for sustainable mobility and the Biofuels Directive exemplifies how such efforts can begin at EU level. The Directive is embedded in a multi level governance context where national governments are responsible for its implementation at national level. So far such process has been rather disappointing. The 2005 target was missed by far and the 2010 final target seems now out of reach.

The scholarly literature on multi-level governance has generated a series of hypotheses to explain implementation in multi-level governance but despite a large number of single case and some comparative case studies of implementation of EU policies there is no clear cut answer, or ready available single set of explanatory variables. Our aim in this paper is the creation of a causal model to test existing theories found in the literature on a sample of ten member states. The variables considered in this study include: mismatch of policy frames, misfits between different policy contents, policy style, government administrative structure, role of veto players and reform capacity of national governments. The methodological approach employed is qualitative comparative analysis and the construction of the model is described in four steps: country sample and time period selection, variables definition, hypotheses formulation and their operationalization. The findings of this paper will contribute to our work in a larger project on implementation of sustainable mobility[2].

[2] IMPACT is a Mistra financed project within TransportMistra (http://www.mistra.org/mobility)

1 Biofuels and Sustainable Mobility

It is generally recognized that transport patterns lead to resource depletion and environmental pollution and are particularly implicated in the climate change problem. Just as was prescribed by the World Commission of Environment and Development (1987) development in the transport sector need to be within the limit of what ecosystems can handle, and in a way as not to harm future generations. Sustainable development strategies in various sectors have since the Rio conference (UNCTAD, 1992) been suggested as the way forward. In this paper we subscribe to a notion of sustainable mobility as a vision of mobility patterns and transport systems that serve a society which is developing within the limits of sustainability. It is interpreted as an idea, or an ideal condition, to be achieved through policy measures and programmes of different nature in various sectors. To be considered a potential step towards sustainable mobility a change or a policy needs to fulfil three overall criteria (Gudmundsson, 2007):

- to reduce pressure on natural life support systems (including the climate system);
- to increase the well-being in a broad sense on the present generations avoiding entirely negative effects on future generations, and on people living in absolute poverty;
- be designed and implemented with the active participation of relevant major stakeholder groups.

The production and consumption of liquid transport fuels derived from biomass, commonly referred to as biofuels, is, as we see it, an attempt to reach goals of sustainable mobility in the area of fuels. Biofuels that include bioethanol, made from sugar and starch crops, and biodiesel made from vegetable oils, are the only alternatives to fossil fuels commercially available on the market.[3] Those fuels have a fair, but important, prospect to promote a more sustainable future because of their renewable character. Currently much of the discussion revolves around the idea that the use of biofuels can reduce transport induced greenhouse gas emissions[4] and increase security of energy supply, both in the number of suppliers and in the variety of energy sources[5]. In addition, the production of biofuels can promote economic development and employment in rural areas. For these reasons it is claimed that biofuels have a unique role to play in European energy and

[3] Research is under way to develop second-generation production techniques that can make biofuels from woody material, grasses and waste. Although these fuels have an even greater potential to promote sustainability than bioethanol and biodiesel, they are not expected to become commercially available before 5-15 years time (Åhman et al, 2005).

[4] See the study of the JRC (2007) for a reference on the potential reductions achievable with biofuels.

[5] The EU is not oil self sufficient and current import levels of 50% of the EU transport sector are expected to reach 70% within 20 years. At the same time, world oil resources are expected to concentrate in the Middle East region with great concerns of EU governments about the security of oil supplies.

transport policy (EC, 2007). In this paper we work from the assumption that although the use of biofuels constitutes only a small and perhaps only incremental change towards sustainability, biofuels fulfil this requirement under the condition that the entire chain of production of biofuels is done in respect of environmental, social and economical sustainability principles. In fact, we see biofuels, and in general renewable energies, not sustainable *per se*. We acknowledge the need to avoid substantial negative impacts on the environment and ineffective-inefficient reduction of greenhouse gas emissions through continuous assessment and improvement of production methods and practices in compliance with sustainability principles.

The European Union subscribes to the notion that biofuels can promote a more sustainable transport sector and, based on that assumption, has decided that their use shall be supported throughout the Union. Directive 2003/30/EC, usually referred to as Biofuels Directive, together with few other high policy documents[6], represents the current EU policy for transport biofuels. The Directive requires member states to support the consumption of minimum levels of biofuels as a means to achieve policy objectives stated in Art. 1[7]. To attain those objectives member states shall set national indicative targets for the share of biofuels on their national markets of motor fuels. Countries are allowed to differentiate from the Directive's reference value of 2% in 2005 and 5.75% in 2010 if appropriate motivations, on the basis of Art. 4[8], are presented to the European Commission. To achieve consumption targets countries are allowed to import biofuels and biomass, and employ the policy instruments and measures[9] of their choice. For example those that best fit their national conditions and domestic interests[10] in respect of all EU regulations.

So far we have suggested that biofuels can contribute to sustainable mobility, and that the Biofuels Directive exemplifies how such efforts can begin at the EU level. We also argue that is in compliance with the subsidiarity principle[11] that production, trade and consumption of biofuels is best coordinated through action at the EU level, rather than what would be with 27 autonomous national initiatives. It is also evident after 50 years of experience with EU policy-making that EU level initiatives, like the Biofuels Directive, are just the starting point for changed practices. What follows is compliance and implementation, processes that are, it will be shown below, rather intricate and

[6] Directive 2003/96/EC on the taxation of energy products, Biomass action plan (EC, 2005) and EU strategy for biofuels (EC, 2006).

[7] "…contributing to objectives such as meeting climate change commitments, environmentally friendly security of supply and promoting renewable sources."

[8] Motivations for differentiation from EU reference values include, but are not limited to:

- Limited national potential for the production of biomass;
- The use of domestic biomass resources for other energy uses than transport;
- Specific technical or climatic characteristics of the national market for transport fuels;
- National policies that allocate comparable resources to the production of other transport fuels based on renewable energy sources.

[9] A distinction between policy measures and instruments is here made. Measures are the social or technical change provoked or avoided through the application of policy instruments. Policy instruments are "the set of techniques by which governmental authorities wield their power in attempting to ensure support and affect or prevent social change" (Vedung, 1998, p. 21).

[10] Domestic interest is used here in a broad sense to denote domestic political interests, policy objectives, driving forces, etc., that are relevant in the context of biofuels.

[11] The subsidiarity principle (Art. 5 Treaty Establishing the European Community) states that policy action shall be taken at the closest level to the target population. Following this principle, the EU Directive 2003/30/EC adopted in 2003 clearly states that its policy objective "…cannot be sufficiently achieved by the Member States by reason of the scale of the action, and can therefore be better achieved at Community level"

complicated processes of what is termed multi-level governance (Marks et al, 1996). Multi-level governance focuses on policy making and implementation between different jurisdictional levels. If the Biofuels Directive is going to work as intended, to increase sustainability in the transport sector by the introduction of renewable fuels in the member states, depends on its success in the multi-level governance process from the EU level to the producer and local consumer through national policy action. This process has been rather disappointing so far. In 2005 the consumption of biofuels in the EU was only 1% against a 2% reference target set in the Directive. National governments lack behind their obligation to implement and the 2010 target seems now out of reach (EC, 2007).

The scholarly literature on governance has pointed to implementation problems in multi-level governance and generated a series of theories to explain this. As discussed at length below, various factors are held to make implementation of EU policies more (or less) likely to occur. Some of the theories found in the literature focus on the concept of misfit between EU and national systems, policies and institutions, others point out factors such as country reform capacity and the position of veto players. In the next section of this study we discuss previous research on multi-level governance in different policy areas with the aim to pin down a number of factors that can be simplified and operationalized into testable hypotheses. The goal in this paper is to develop an analytical framework that will allow us to test hypotheses of non compliance cross-nationally. Section three introduces the methodology of the paper. The approach employed is qualitative comparative analysis (QCA) based on Boolean algebra. In part four the ambition is to identify conditions that are related to multi-level governance and have a significant impact on policy implementation. Ten empirical cases will be considered in the model. Each case is about the national implementation of the Biofuels Directive from 2003, year of adoption, to 2005, year of the intermediate target. Although the test of the theoretical hypotheses on the empirical cases is not part of this paper, some preliminary reflections and future application of the framework are illustrated in the final section. The objective of this paper is in close connection with the overall aim of our research within the TransportMistra IMPACT project,[12] that is to understand if and how multi-level governance affects the possibility to implement policies for sustainable mobility.

1.1 Implementation in multi-level governance – A Literature Review

In the literature on multi-level governance the problem of implementation has been studied rather extensively and we find it helpful to learn and borrow from those studies in our work. The main ambition of this chapter is to motivate the selection of variables through studies of implementation in a multi-level governance context. As many scholars (among them Heritier et al. 1996, Knill 1998 and Börzel 1999) have argued, implementation problems will arise when states are expected to do what they cannot or do not want to do. Institutional perspectives, too, highlight that existing implementation structures, institutional histories and path dependencies that are established within state administrations do not adapt easily or quickly to external changes or new political objectives (cf. Olsen 2002:925). Thus, we may expect that specific implementation problems arise in the intersection between the national and European level. This

[12] The IMPACT project is an interdisciplinary project whose main ambition is to develop models and tools to support sustainability oriented decision-making and policy implementation in the transport sector.

relationship will be in focus in this paper. At the same time, it is evident from the research on multi-level governance that institutions adopt new policies and change.

Despite a large number of single case and some comparative studies of implementation of EU policies there is no clear cut answer, or readily available single set of explanatory variables. The picture is messy and highly complex (cf. Heriterier and Knill 2001:286). Having said this, the ambition here is nevertheless to simplify by pinning down a number of relevant factors. By looking at those factors in an empirical context we can provide a better understanding of the effects of those factors.

With a similar ambition, Jordan and Liefferink (2004:231) try to pinpoint factors that have an impact on how Europe transforms domestic policy. In a comparative study of ten European countries in the environmental issue area they conclude that EU influence has been most transformative regarding specific policies and less when it comes to national policy styles and policy structures. Although the study does not establish clear causalities, i.e. what specific domestic changes are due to multi-level governance, it points to aspects worth of a closer look, namely: policy content, policy style and policy structures (Liefferink and Jordan 2004:20-25). Differences between the EU-level directive and the member state context in these three areas lead to 'misfits'. When there are misfits, national institutions and policy makers have pressure from the EU level to change policy, adopt policy styles and structures in a way they would not if policy, styles and structures matched. Consequently, member states will act differently in response to the one and same EU policy. Some member states will resist, others will absorb the EU policy yet others will transform policies, styles and structures. Liefferink and Jordan (2004) argue, that the variance in response can be explained by looking at the degree of misfit between the EU policy and the domestic context in relationship to the above three factors.

The notion of 'misfit' has turned out to be a powerful explanation for implementation failure of EU policies. Misfit will be particularly relevant for two factors that are included in our framework; policy frame and policy content and explained in more detailed below. The misfit hypothesis takes as its starting point a rather strict top-down approach to Europeanization, i.e. it is about EU policies having affects or reactions of some kind (even if it is resistance and non-action) at the national level in the member states. Other researchers have argued that Europeanization is a dynamic process (Bomberg and Peterson, 2000; Goetz, 2002; Geyer, et al. 2005:67). Our conceptual framework will not be able to take those dynamics into account. However, a way to try to include more complexity while avoiding compromising the general explanatory potential of the work, we include factors that are related to how implementation is carried out within the domestic governance system and have shown to be relevant for compliance and implementation. Policy style, administrative structure, veto players and reform capacity are the remaining four factors included in the framework. In the following we present the theoretical background for the variables that we have chosen to analyze in the comparative study.

Policy frames: Matching or mismatching?

Ulrike Liebert (2003) shows that an understanding of multi-level governance must consider the issue of framing because Europeanization is about creating shared "frames of references by framing common sets of beliefs and ideas, and creating common frameworks" (Liebert, 2003a:15). Liebert's study on EU equality norms showed that 'misfits' between different frames around gender regimes embedded in the EU norm, versus frames at the national level created implementation problems. The difference in frames regarded the way gender relations were viewed, conceptualized with the effect that it organized gender relations in particular ways within a member state (Liebert,

2003b: 261). While they use a different terminology, Heritiere and Knill (2001) work from a similar notion and argue that how 'transport' has been framed can explain why Great Britain, Germany, France, Italy and the Netherlands have diverged considerably in responding to EU Road Haulage Policy and Railways Policy. The divergence of frames between the countries, articulated by the authors as being either pro-liberal, liberal or interventionist, was crucial for how the countries responded to EU Policy. For example, in Britain a neo-liberal ideology dominated whereby rail transport was an instrument of the economy and thus, must also be governed by market principles (Knill, 2001:71,80,92). On the other hand, France (Douillet and Lehmkuhl, 2001:109) and Italy considered rail transport part of a wider social framework. According to this frame, transport must serve the interest of the public and the state should play a determining role (Heritiere and Knill, 2001:275). Hence, in the research on transportation policies Heritiere and Knill seem to verify what Liebert argues i.e. 'Misfits' and implementation problems will arise when the European framing does not match, or fit with national frames of reference.

Misfits between different Policy Goals

In their conclusion Jordan and Liefferink write that the most significant changes that they see in the 10 member states studied, has to do with changes in policy content. Particularly, fundamental changes were related to policy goals. The changes were due to the misfits between EU-level and national level policy (Jordan and Liefferink, 2004: 224). That adaptation is more extensive regarding policy goals is perhaps not so surprising considering that all EU directives set common goals and member states are free to select the policy measures and instruments for attaining those policy goals. Hence, there should be more pressure to adopt policy goals. Jordan and Liefferink's study rely on Hall's conceptualization of policy which considers policy in three dimensions: policy instruments and measures; the setting of policy instrument and the overall goals that guide policy within the policy frame (Hall, 1993:278). We opt to focus our study on policy goals because for the above mentioned reasons we find it most relevant.

Policy style: the procedures to include or exclude societal actors

The concept policy style is a member state's approach to problem solving, particularly focusing on standardized procedures for decision-making and implementation. Richardson et al (1982) suggest two dimensions in which policy style can be studied, one dimension ranging from anticipatory to reactive policy style and the other ranging from consensual to adversarial.[13] For our purposes we think the latter dimension is more pertinent. The differentiation of government action from anticipatory to reactive is not of interest here because governments react to the requirements of the EU Directive and proactive policies concerns the pre-directive phase of the process and are not the focus of this study. Like, Dryzeck et al (2003) who also highlight the importance of the government's approach to problem solving, we also want to consider this in terms of patterns of inclusion and exclusion. It concerns the way policy procedures are set up to include societal actors. The state's approach to problem solving is interesting also in terms of effectiveness, and ties into a current debate on democracy and 'good governance.' Scholarship recurrently point to the prevailing problems of governance deficits and implementation gaps (Scharpf, 2001) in sustainable development policies (Haas, 2004) and see solutions and improvements through more inclusive governance forms (Durand et al 2004; Smith 2003). Taking these developments and discussions into account we think the most pertinent question to ask about policy style is to consider

[13] Jordan and Liefferink (2004) apply both dimensions in their comparative study on the Europeanization of national environmental policy.

whether or not governments are using procedures for seeking consensus with a broad range of actors in the implementation of the Biofuels Directive.

The organization of issues in the government structure

Implementation capacity, argues Heritiere and Knill (2001:259), is also "determined by the number of formal and factual veto positions that need to be overcome in order to realize a decision." We know that administrative organizations have a tendency to deal with problems by disassembling them in manageable units (Torgerson, 1990; Dryzeck, 1997) for example with a tendency to break down problems into sectors and sub sectors. It can even be argued that the 'rationale' for the modern organization is differentiation and division of labour (Clegg, 1990; Styhre, 2002:166-179). We think that the way that policy making is organized in member states can be one important variable in the search for implementation failure or success. Experiences in the environmental policy field have pointed to the specific problem of sector politics. That environmental policy most often was organized into its own sector, like a ministry or agency has been shown not to be optimal because the environmental sector deals with problems that are generated in other sectors, like agriculture, transport and industry. In order to override this other organizational arrangements have been called for, like sector integration or cross-sectoral solutions. Learning from the research in that field shows, firstly, that how a topic is organized into politics and administration is important. Secondly, it is key to what sector a 'new' policy is assigned because it will compete for attention. Thirdly, how well a 'new' policy fits in with the overall aims and ambitions of the sector determines if it will be prioritized or not. In the EU Commission's agricultural DG, environmental concerns were included only when they could be used to back up and reinforce the agricultural argument (Kronsell, 1997:137). Certain issues can even fall between sectors, like biodiversity and nature conservation (EC, 2004) and not find a proper administrative 'home'. From this we conclude that how the issue of biofuels for transport is organized administratively is important and needs to be considered in a study of implementation.

The Important Role of Veto players

In the study of multi-level governance some researchers have taken a more actor-oriented perspective and have argued that the role of domestic actors' views is relevant for implementation. Difficulty in implementation occurs because domestic actors have different visions on how they want to reform policy or they have different preferences (Haverland, 2000; Dimitrova and Steunenberg, 2000). Heritiere et al (2001) further suggest that veto positions can arise from configurations of actors with varying interests. Veto players[14] are actors whose agreement is required to change the status quo (Tsebelius, 1995:289). These actors could be part of the government or administrative structure or part of the societal sector. That veto positions can come from the societal sector was exemplified by France's adversarial societal versus state relations shown to have had high relevance in the transport area (Heritiere and Knill, 2001:264; Douillet and Lehmkuhl, 2001:118, 123). Veto positions can also arise between different jurisdictional levels in the administrative system as Steunenberg (2006:294-5) argues. He uses an actor-oriented approach and posits that an important question is to find who the relevant national actors are. The concept veto players we use to indicate that their role is such that they can clearly influence the process of implementation of a policy and stop or veto it if it is not in accordance with the will or interest of that actor. In our analysis we will try to find which the most relevant actors are. Assuming then, that being relevant they also have a

[14] We are inspired by Tsebelies concept and general approach but will not be interested in establishing how many veto players are required for implementation.

stake or interest in the implementation of the Biofuels Directive and a possibility to veto it.

Reform capacity: an important condition for effective implementation

Börzel (2002) contends that it takes resources to implement and the member states that are better off economically also have the resources required to implement policies. Typically, mismatches inflict significant demands and costs on member states' implementations structures. In general, the costs are noticeable and thus, the better the 'fit' the lower the costs of adaptation (Börzel, 2002:196). Accordingly when member states fail to comply with EU legislation this is not necessarily intentional but because they lack the capacity to act. Tallberg (2002) talks about three types of reform capacity: political, administrative and economic. Political capacity is lacking if governments are unable to govern administrative and private actors and thus, they lack power to enforce compliance. Tallberg says that the division of power in government or between different jurisdictions like federal or regional levels can reduce political capacity (2002: 58). In our study we consider governance capacity in the selection of the member states and include federal as well as centralized states and presidential as well as parliamentary systems. We do not treat political reform capacity as a variable. However, Tallberg (2002) also points to problems of implementation related to lack of administrative capacity and includes; access to expertise, personnel and institutional resources. We think administrative reform capacity is intimately related to economic reform capacity and treat it as such in this study. Economic resources are required to equip the administrative institutions with expertise, personnel and the institutional infrastructure needed for implementation and reform. This means that if a member state has enough resources that can be diverted or channelled into the implementation of an EU directive, less problems with implementation will occur. In the study we consider economic development as a measure of reform capacity.

1.2 Methodology

The research approach employed in this paper, qualitative comparative analysis (or QCA; Ragin, 1987; Ragin, 1994), was developed in the field of comparative politics and related studies. It has been praised for its capacity of analysing complex causation - a situation where a given outcome may follow from several different combinations of causal conditions (Rihoux and Ragin, 2004). The choice of such approach aims to bridge what seem two apparently contradictory goals. On one hand, to gather in-depth insight in the cases considered in all their complexity, on the other hand, to produce some level of generalization. In fact, QCA is holistic in the sense that each case is considered in its complexity, thus in essence, it is a case sensitive approach that leaves room for complexity. At the same time, QCA allows researchers to examine more than just few cases, otherwise common in case-oriented studies. This is a feature that opens possibility for generalizations (Rihoux, 2003). The findings of our study, although limited to ten countries, should bring insights to the general discussion of why and how EU policies for sustainable mobility are implemented, more or less effectively, in the member states.

On a more specific level, QCA is also a technique based on the formal logic of Boolean algebra, which requires each case to be reduced to a series of variables (conditions and outcomes). As a technique, QCA displays further qualities that we consider important. First, QCA is a transparent technique which forces researchers to make choices and to justify them from a theoretical and/or empirical perspective (Rihoux and Ragin, 2004). If this is a problem with some policy studies, our aim is to study and observe complex

issues, like the biofuels', by making choices and justify them to allow the replicability of the study, which enables other researchers eventually to corroborate or falsify the results of our analysis. Second, QCA allows us to consider phenomena that vary both qualitatively and quantitatively (Ragin, 1987). Third, according to De Meur and Rihoux (2002), QCA can be employed for different purposes, at least five, including: to summarize data, to check data coherence, but also, to test hypotheses or existing theories, to test assumptions or ideas not embodied in existing theories and to elaborate new theoretical assumptions in the form of hypotheses. In this paper, we employ QCA approach and techniques to test existing theories found in the literature on policy implementation in multi-level governance systems like the EU.

The QCA approach is not without problems. One major problem stems from the conversion of continuous variables into dichotomous ones. The researcher must assume the existence of a threshold in the relation between independent variables (conditions) and dependent variables (outcomes). In our case for instance it is the researcher's responsibility to decide and justify why reform capacity exists when the national budget shows a deficit of 2% but it does not exist when the deficit is above 3%. Another limitation in QCA is the inability to examine the proportional relationship between variables. QCA posits that under certain conditions the dependent variable will occur (Blake, 2001). Considering the reform capacity example in our study, we do not have the possibility using QCA to relate a greater feasibility of policy implementation to a case characterized by a 1% deficit compared to a 2% deficit case. QCA employs a deterministic causal approach in relation to one defined threshold. Further problems rise from the contradictions – uniqueness trade off. If too many variables are included, a problem of uniqueness might occur. Each case is then simply described as a distinct configuration of variables, which result in full complexity and no parsimony. On the other hand, if one uses too few variables the probability of contradictions increases (Varone et al., 2006). We chose a number of six independent variables to be tested on a sample of ten countries and that will produce 64 hypothetical causal combinations. To note that only a small group among these 64 combinations will be found in our empirical cases. How to treat these logically possible, but non-observed combinations is an issue that has produced much discussion among scholars (Ragin, 1987). The epistemological issue at stake here is once again the arbitration between parsimony and complexity, or the level of reduction of complexity that one should aim at (Rihoux, 2006). We will consider only the situations that have occurred in these ten countries and will not encompass all conceivable situations. It thus will remain and open question whether these situations are capable of fostering the effective implementation of the Biofuels Directive since no empirical evidence exists.

QCA involves three main phases. First, the researcher must gain enough familiarity with the cases examined and the issue at stake. A compatible number of cases and independent variables (conditions) are identified. The operationalized conditions are tested on the empirical cases to produce a raw table, in which each case displays a specific combination of conditions (with 0 or 1 values). From the raw table and with the use of software, the researcher produces a truth table which displays the data as a list of configurations. A configuration is a given combination of some conditions and an outcome. A truth table lists the logically possible combinations of causal conditions and the outcome associated with each combination. The use of truth tables to unravel causal complexity is described in detail elsewhere (e.g. Ragin, 1987; Ragin, 2000; De Meur and Rihoux, 2002). The essential point here is that the truth table elaborates and formalizes a key analytic strategy of comparative research: examining cases sharing specific combinations of causal conditions to see if they share the same outcome.

The second phase is Boolean minimization, in which the long Boolean expression, described in the truth table, is reduced to the shortest possible expression (minimal formula). The minimization should be done with the help of software. In practical terms the Boolean equation, or minimal formula, of our study will tell us in what sort of countries the Biofuels Directive was effectively implemented in 2005. A purely hypothetical example is:

$B = f(R,V + s)$

where B is the effective implementation of the Biofuels Directive; R is the existence of national reform capacity; V is the existence of a policy that satisfies veto players interests; and S is the existence of a consensual policy style. It would mean that B occurs in all countries with reform capacity combined with a policy that satisfies veto players OR where the policy style is not consensual (regardless of the value of the other independent variables)[15]. The last and conclusive phase of QCA concerns the interpretation of the minimal formula, possibly in terms of causality.

1.3 Causal model for analysis – the analytical framework

In any comparative research effort one is confronted with two classical research design issues. The first is case selection: how to select genuinely comparable cases? The second one is variable selection, which refers to model specification. Actually, these two issues are quite closely linked. In this section we explain why and how we selected our cases and the time period of the study. Then we proceed to describe independent and dependent variables (conditions and outcomes) and to formulate hypotheses that can be investigated cross nationally. Each variable is then operationalized to test the formulated hypotheses.

Case sample and time period selection

When selecting the sample of countries to be used in our study we should remember that there is no procedural limit on the number of cases that can be studied using QCA. Limits are set instead by the researcher's degree of interest in maintaining familiarity with each case and his or her tolerance for complexity (Rihoux, 2004). With this in mind we proceed to select cases in a way that allows us to eliminate factors that are not linked to an identical outcome. This strategy for case selection, "the most different systems design" (Henry, 1990), seeks maximal heterogeneity in the selection of cases and increases the possibility to reach more general explanations.

Based on the most different systems design we select ten EU member states: Austria, France, Germany, Italy, Spain, Denmark, Sweden, Poland, Slovenia and Estonia. This is considered a representative sample of member states with variation regarding EU membership time, motor fuel market, geography, implementation record concerning the requirements of the Biofuels Directive and form of state organization. Countries that have joined the Union only in 2007, Bulgaria and Romania, are excluded because the implementation process started only in 2007. Malta and Cyprus are also excluded because are considered exceptional cases[16]. Germany and Sweden are both included in the sample

[15] To remember that in QCA notation, an uppercase letter normally denotes the presence of each variable, while a lowercase letter denotes its absence; a multiplier term links the variables in an "AND" relationship while addition terms express an "OR" statement.

[16] Cyprus and Malta are exceptional cases because following the opinion of the EC (2005) those countries have complied with the Directive's requirements even if they transposed and achieved lower targets than the EU reference values for 2005.

as countries with effective implementation of the Biofuels Directive in 2005, in addition to Austria, which is also considered a case of effective implementation (see Di Lucia and Nilsson, 2007).

The cases are observed along a time period that covers the years from the adoption of the Directive (2003) to the year of the first intermediate target (2005). We are aware that such a short reference time (2003-2005) could have effectively exacerbated lead-time problems, however, these are the references included in the Biofuels Directive and national governments have agreed to them.

1.3.1 Selection of model's variables

Dependent variable – outcome

The focus of our study is on the feasibility of implementing policies for sustainable mobility in a multi-level governance system. What is here interpreted as effective implementation of the Biofuels Directive is the achievement of its referential consumption targets. This focus can be criticised in various ways. First, EU directives normally bind member states to the achievement of policy objectives while leave them (usually) free to choose the most appropriate means and instruments. In the case of biofuels, consumption targets are means for the achievement of the final objectives described in Art.1 and not policy objectives themselves. However, the way the Biofuels Directive is formulated clearly puts the achievement of the referential consumption targets at the core of any evaluation of its implementation at national level. Second, the causal link between the achievement of the referred consumption targets and the policy objectives listed in Art. 1 is not guaranteed to any substantial level. Aware of these issues we, nevertheless, decided to consider the achievement of the 2% consumption target in 2005 as the dependent variable of our model, in accordance with the view expressed by the European Commission (EC, 2001).

Independent variables – conditions

According to De Meur and Rihoux (2002), QCA studies show a broad variation as to the number of conditions included in the analysis, though they claim there should be some connection between the number of cases and the number of independent variables. Furthermore, it is worth to remember that the number of causal combinations produced by the model, shown in the truth table, is a geometric function of the number of conditions (number of causal combinations = 2^k, where k is the number of causal conditions). In an attempt to keep a balance between parsimony and complexity, we find six conditions to include in our analysis and that will result in a set of 64 hypothetical causal combinations.

In the following, each independent variable, derived from the literature review in section 2, is used to create hypotheses that can be tested cross nationally by the causal model.

Policy frames

In the literature we find that framing is about creating sets of believes and ideas. As we illustrate in the introduction of this paper, biofuels is a controversial issue on which various subjects have very different believes and ideas. The EU framing is based on the idea that biofuels have a significant potential to, and therefore should contribute to, reduce transport induced impacts on the environment (specifically in the form of greenhouse gas emissions), promote a secure transport system (with reference to the security of energy supply) and, at the same time, contribute to economic development and

employment in rural areas in the Union and in developing countries[17]. However, the EU framing does not consider biofuels as having the potential to supply 100% of the transport sector's needs. Biofuels are seen as having a small, but rather important, role in a broader EU transport policy aiming at a sustainable transport system which promotes development and integration throughout the Union (EC, 2001a).

In order to test the hypothesis derived from the literature, that *the existence of matching policy frames at EU and national level improves the feasibility of policy implementation*, we assume that national policy frames match when national policies share each and every one of the (3) elements of the EU framing, namely climate protection, improvement of the security of energy supply and economic development in rural areas.

A case in point is the implementation process in Denmark. Since the very first legislative proposal for an EU directive for biofuels in 2002, the government has been fiercely contending each and every element of the EU frame (CEU, 2002). Denmark argues that biofuels are not an effective or efficient way to reduce greenhouse gas emissions, because it is cheaper and more effective to reduce emissions in other sectors than transport. As an oil and energy exporter, the country is less concerned with the problems of international supply of oil that, however, "could become a problem once more, which biofuels alone would not be able to solve", it is claimed (Danish Government, 2004). Advantages for the agricultural sector and rural areas have also been questioned by the Danish government on the basis that the competitive position of Danish producers on the international market is not solid but deeply affected by national support policies to foreign producers. In 2005 consumption of biofuels was nil in Denmark and the lack of results has been explicitly motivated using these and other arguments (for a comprehensive description see Danish Government, 2004). The framing of the biofuels' issue in Denmark does not match the EU frame and this has not improved the feasibility of policy implementation.

Policy content

As previously described, the definition of policy content can be divided into 3 levels: policy instruments and measures; the setting of policy instruments; the overall goals that guide policy within the policy frame (Hall, 1993: 278). In our model, to test whether *the existence of national policies in agreement with the content of the EU policy for biofuels improves the feasibility of policy implementation*, we define policy content as the overall goals stated in the policy. However, we are aware of the importance that the choice of specific policy instruments and measures can have. In fact, by choosing some instruments and not others member states reveal the ambition to achieve overall goals that might differ from the ones officially stated. With this in mind, we assume that national policies are in agreement with (the content) of the EU policy when they aim at similar overall goals *de jure* or *de facto*. The former is about the overall goals stated by the national policy, whereas the latter regards the introduction of specific instruments and measures that reveal different policy goals.

The case of Spain is useful to illustrate this. Spain had a national policy for biofuels in place well before the EU Directive entered into force. Since its inception the overall goal of the national policy has been to promote national production of biofuels while national consumption has not been actively promoted. Hence, biofuels produced in compliance and with the support of the national policy have been exported to other countries where market conditions were more profitable. This was due to a lack of incentives to consume biofuels. The Spanish policy for biofuels officially (*de jure*) does not aim at consumption as required by the EU Directive and the policy instruments adopted support (*de facto*)

[17] See the EU strategy for biofuels (EC, 2006).

national production rather than consumption of biofuels. This situation does not improve the feasibility of policy implementation.

Policy style

The aspect of policy style that we find relevant here is the government's relationship to other actors in the policy process, which ranges from "consensual" to "adversarial" (Richardson et all, 1982). Whether the government invites these actors early in the implementation process could be important. The government in order to promote biofuels' consumption has to persuade numerous actors, often having different agendas and objectives, to act. First, biofuels need to be produced and this requires the involvement of farmers and industry. Alternatively, biofuels can be imported, but this implies that suitable quantities are available on the international market. Following production, biofuels need to be delivered to consumers and oil distributors are the actors with infrastructure and know-how for that. However, consumers cannot use biofuels if engines and vehicles are not made compatible with the characteristics of these fuels. Finally, consumers' decision to use biofuels is affected (positively or negatively) by environmental-social movements and consumers' organizations. Hence their cooperation can also be important. The actors described in these five categories have the potential to play a role in the implementation process and national authorities have to attain their active involvement.

In order to test whether *the existence of a consensual policy style improves the feasibility of implementation*, we decide to evaluate government's procedures for seeking consensus with a broad range of actors in the implementation process. For this purpose, national policy style is considered consensual if procedures are defined to acknowledge the position of all the categories of interested actors during the policy process. What we want to assess here is if actors' positions and interests are acknowledged and not if their interests or views are reflected in the policy adopted (we discuss that in the veto players section). For the purpose of this study, we identify five categories of actors that the government should consult in the policy process in order to be labelled consensual and we consider a member state as having a consensual policy style if it has consulted at least one representative from each category.

Italy is a good example to show the importance of policy style to implementation. The Italian policy making process in the case of biofuels cannot be considered consensual using our definition of consensual policy process because standardised procedures to acknowledge the position of interested parties do not exists or are not applied. The national Law (DL. n.128/2005) for the implementation of the Biofuels Directive states that the national policy is adopted by the ministry of economic development on the advisory opinion of the biofuels commission. In its opinion the commission is not required to include the position of social and economic actors. The result is that categories of interested actors are not guaranteed a procedural way to participate in the policy making process. Informants told us that in reality it is left to the influence of each actor and to the sensitivity of the responsible ministry to allow private actors' positions into the policy process (Lumicisi, 2007). This is an obstacle to the active involvement of all the actors of the biofuels' chain and thus a problem for the implementation of the Biofuels Directive.

Government administrative structure

Following from the theory and studies presented earlier how issues are organized into the government and administrative structure is relevant for implementation in various ways. This variable deals with how authority for the implementation is organized. There are

many dimensions to this, for example: which subject assumes the responsibility for biofuels policy and whether that government administration has competence and influence to act in the relevant sectors and whether the biofuels issue is compatible with the overall aims and ambitions of such subject, are three important questions here. In order to be able to study this factor, it is simplified and operationalized in terms. We think that the key issue is whether authority around the biofuels issue is concentrated or dispersed because in any administrative setting issues are competing for attention and the likelihood that agreement is reached on an issue is if authority is concentrated in one administrative sector. In this study we will focus on whether the governance of biofuels at the national level results in the implementation of the Directive being within the authority of one administrative sector or whether it is dispersed across many sectors.

The hypothesis investigated is that *the existence of a concentrated authority improves the feasibility of policy implementation*. We assume the existence of a concentrated authority when the authority to formulate and propose national policies is exclusive to a specific subject (ministry or agency) so that the initiative cannot be taken by other actors and an agreement is not required. Although it might be relevant we will not consider what type of subject has the authority or if consultations with other subjects are required.

The case of Austria can help us to make this clear. The Austrian government has adopted a complex national policy for biofuels that includes policy instruments and measures of various natures to give effective implementation to the Biofuels Directive. It has succeeded and informants from the competent ministry have told us that national policy was successful for various reasons. One of the reasons mentioned is that the responsibility of biofuels' policy was allocated within the authority of one ministry, the ministry of agriculture, forestry, environment and water management. So that discussions and negotiations were held within the ministry and that was perceived has an advantage (Bach, 2006). Authority to formulate national policies for biofuels has been exclusive to one ministry in Austria and that has improved the feasibility of biofuels' policy implementation.

Veto players

The hypothesis to be tested in our study is that the existence of a policy for biofuels that includes and reflects the position and interests of veto players improves the feasibility of policy implementation. For this purpose it is necessary, first, to identify veto players and, second, to define when their interests and positions are effectively reflected in the national policy. About the first point, we will evaluate the specific circumstances of each empirical case to identify one or more veto players among the relevant actors involved in the biofuels sector. Agriculture/farmers' groups, biofuels' industry, car producers, oil suppliers and environmental-consumers' organizations are the groups where we look for veto players. About the second point, we assume that veto players' positions and interests are reflected in the national policy when the measures, instruments and expected outputs of a policy are compatible with or promote the interests of those categories of actors.

To illustrate the case of veto players, we describe the situation in France. It is recognised that the biofuels sector is a policy driven sector where policy measures and instruments steer its development. In France biofuels policy was first adopted in 1993 and since then the biofuels sector has grown constantly until 2002. However, public policy support became weaker after 2002 and that was reflected on the size of the national market. One motivation of the decreasing policy support is that the strong interests involved in the sector could not find a common position to allow policy makers to formulate a suitable policy. This situation compromised the development of the sector until 2005 when biofuels' consumption reached a modest 1%. The lack of agreement on a policy plan that

would satisfy the interests and positions of all relevant actors was a major obstacle for the adoption of a suitable policy in France. Only in November 2005 the national government gathered all relevant actors to discuss and agree on a national plan for biofuels[18]. Three categories of actors participated to the formulation of the plan, together with the ministry of agriculture and the ministry of industry, namely: the oil companies, the car industry and the agriculture sector. The result was the most ambitious national plan for biofuels ever adopted in the EU (French government, 2006).

Reform capacity

Reform capacity is a powerful concept to link public policy with changes of the status quo. In the literature we find suggestions that *the existence of economic resources that can be diverted or channelled into the implementation of a policy improves the feasibility of implementation*. In this study we choose to test this hypothesis by considering economic development as a measure of reform capacity. Based on that, we assume that member states do not have sufficient economic resources to support reform capacity in case their national budget shows an annual deficit above 3% along the considered period (2003-2005). The 3% limit is a well known reference value to limit public deficit in countries that are members of the Euro-zone area[19]. We motivate this approach by the fact that policies in support of biofuels require governments to invest substantial economic resources. Especially tax incentives, currently the most employed policy instrument to support biofuels consumption, imply a substantial reduction of public incomes that is often the cause of intense debates and criticisms[20].

Poland is a case in point to show how reform capacity can affect implementation of biofuels policies at national level. Among other member states, Poland argues, in its annual national reports to the Commission, that national implementation of the EU Directive is conditional to the availability of economic resources in the national budget. In fact, the national budget has shown a deficit from 2003 to 2005 in connection with harsh economic reforms introduced in the country in its move from a planned-centralized to a market type economy. The Polish government has been struggling to reduce its deficit from -4.7% in 2003, -3.9% in 2004 to -2.5% in 2005 by reforming the tax system. The national system of tax exemptions for biofuels, first adopted in 1993, was revised twice in 2003 and in 2004 with the effect of reducing the loss of national incomes from 274 million PLN in 2002 to 68 million in 2004 (Polish Government, 2005). This development, which has taken Polish producers to export to other EU countries where economic conditions were more favourable, is seen as a consequence of the lack of economic resources in the national budget and thus reform capacity.

[18] A description of the meeting *"Table ronde sur les biocarburants"* and its results is available at the web site of the ministry of economy, finance and employment (www.francetech.gouv.fr).

[19] The Stability and Growth Pact is the concrete EU answer to concerns on the continuation of budgetary discipline in Economic and Monetary Union. Adopted in 1997, it strengthened the Treaty provisions on fiscal discipline (Art. 99 and 104) safeguarding sound government finances as a means to strengthening the conditions for price stability and for strong and sustainable growth conducive to employment creation (CEU, 1997).

[20] Currently, several member states are introducing or considering the introduction of consumption obligations in alternative to tax incentives. One strong argument to campaign this shift is the limited impact that obligation systems have on public budgets.

1.4 Reflections

In this paper the construction of a causal model to test theories on policy implementation in multi-level governance is described. This is only the first step of our research but it is a crucial step that will deeply affect the final results of the study. So far, the main results of our study are related to methodology concerns and to the theoretical background that we want to include in the model. First, QCA is an approach that owns some qualities of quantitative methods and some of qualitative methods. We found this a suitable combination for our purposes because we want to investigate a number of cases that is too big for qualitative methods and too small for quantitative, at the same time, we want to be able to consider each case in its complexity while trying to achieve some level of generalizations. For these reasons QCA appears to be a suitable method. Second, in relation to the theoretical background, we found at least some examples that confirm the validity of the results of previous studies. The set of conditions considered in our model include: mismatch of policy frames, misfits between different policy contents, policy style, government administrative structure, role of veto players and reform capacity of the national government. Although we find indications that each condition has some relevance to the case of biofuels, we cannot pick winners at this stage. We are still of the opinion that despite a large number of single case and some comparative case studies of implementation of EU policies, there is no clear cut answer, or ready available single set of explanatory variables. In this context, we will proceed to the evaluation of the validity of each condition found in the literature on the sample of cases.

We would like to recall the importance of this type of studies. Based on the assumption that the use of liquid fuels made from biomass represents an incremental change towards a more sustainable transport sector (although probably only a small change), the implementation of the EU Directive for biofuels becomes decisive because the promotion of sustainable mobility is a necessity of modern societies. The disappointing implementation of the Biofuels Directive in the member states until 2005 generates concerns in this sense. In relation to our future work, the first step will be to collect all relevant material from each case. The data collected will be used to create a truth table from the model. We need to become familiar with each case in order to apply effectively the framework described in this paper and be able to move back and forth between theory and the empirical cases to solve possible contradictions and to interpret the minimal formula in terms of causality. Contradictions are configurations whose outcome is, in some cases, equal to 1 and in some cases equal to 0, while displaying the same values on the conditions. Contradictions must be resolved before moving ahead with analysis. This involves going back to the empirical cases and to theory. Technically the minimal formula expresses co-occurrences, it is then up to the researcher to decide how far to go in the interpretation of the minimal formula in terms of causality relying on his substantive (case–based) and theoretical knowledge.

It is to remember that the model here presented is not a final version but it will be modified and tuned along with the collection of the empirical material and the analysis of the minimal formula. The findings of this study will contribute to our project within the IMPACT project for the promotion of formulation and adoption of more sustainably oriented transport policies.

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The spatial conditions for a vital compact city
The structure of the street net and its impact on urban sustainability

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Keywords:

Urban Sustainability, Compact cities, Street grid, Spatial configuration, location pattern of shops, crime in urban areas

1 Introduction

How can urban sustainability be described scientifically? Or can it be described at all? So far, it is problematic due to the lack of well-defined concepts. This lack is one of the problems many authors face when making proposals on how sustainable development in cities can be understood and achieved. The compact city model is proposed in order to encourage sustainable ways of living. As this contribution will conclude, urban compactness can best be approached from a configurable point of view due to that compactness is a topological term. The answers might result in an understanding of the manner in which the configuration of an urban grid generates movement and visibility, and of how it influences a balanced dispersal of economic and social activities.

2 Conditions for sustainability

There is an essential difference between **preventing** someone from driving a car and **making** him do so. If one wants to prevent it, one can e.g. take away all fuel. Thus disposing of fuel is a condition **necessary** for the usage of a combustion engine. On the other hand, making someone drive a car requires a set of **sufficient** conditions to be fulfilled. For instance, the person in question is supposed to dispose of some kind of appropriate know-how, he might in a sense be willing to co-operate and listen to our arguments. None of these conditions taken in isolation is sufficient to make him drive. Numerous other ones are relevant in this case. If all of them are fulfilled he will be driving.

This consideration pertains to the concept of sustainability. Sustainability is not relevant only if we assess its conditions. At issue is thus the concept of a necessary condition as to why something became **possible** and, likewise, the concept of a sufficient condition such that something became **necessary**. The difference between these kinds of conditions pertains to human action and policy in general and thus to sustainability in particular.

This contribution attempts to answer the question in what ways a morphological in other words configurational approach contributes to our understanding of urban sustainability. This broad subject will be approached in the following way: Firstly, the term sustainability requires some explanatory remarks. They will secondly lead to a discussion of urban sustainability. Thirdly, compactness and its impact on urban sustainability will be taken into consideration. Finally, compactness will be reconsidered in configurational terms. The difference between necessary and sufficient conditions will pertain to each of these sections.

3 The problem of the concept sustainability

The subject of sustainability introduced itself for good reasons. During the 20th century cities tended to put economic expansion on their agenda at the cost of social well being and environmental equilibrium. The social effects are for instance placelessness, exclusion, insecurity, criminality, and loss of cultural identity. The environmental effects are among others bad air quality, pollution, and low-density urban sprawl. Furthermore, the effects of traffic congestion and deteriorating infrastructure and built environments have affected the locations of economical activities (Patermann 2002, p.1).

The Brundland report of 1987 and the 1992 Earth Summit in Rio de Janeiro rightly predicted that in the beginning of this century more than 50% of the world's population will live in urban areas. During the last decades, increased energy use for transportation in urban areas contributed to the greenhouse effect. In these contexts the concept of a sustainable development came on the agenda and turned into a fashion word of the 90's. The manifold difficulties in defining this term naturally reflect its political origin (Jenks 1996, p. 3-6).

There are numerous definitions of the term "sustainable development". According to the 1992 Earth Summit in Rio de Janeiro, "sustainable development" is defined as a "development which meets present needs without compromising the ability of future generations to achieve their needs and aspirations" (Jenks 1996, p. 233). A major problem in defining sustainability in this manner results from the term's normative as well as descriptive aspects. From a normative point of view, questions of the following kind seem appropriate: Should something be sustainable and what should be done in order to guarantee its sustainability? In this case one intends to assess a certain goal in terms of sustainability. The descriptive aspects of sustainability, however, concern what actually is or will be the case. According questions ask what is or will be sustainable. If intentions of future generations are taken into account at present it is most difficult to keep their structural distinction.

One should in principle try to assess whether scientists or politicians propose a normative or descriptive understanding of sustainability. The issue is difficult. For the suggestion of the Brundtland Report concerns present as well as future needs, hence not just descriptive, but likewise normative matters.

4 Urban sustainability - the city as an object or a process?

Sustainable, the quoted definitions tell is not an object but a development or process. That will say a development influenced by or consisting in human interaction. It is a complex process. Urban sustainability is a particular case of sustainability. If sustainability is about processes one has to speak about urban sustainability or better a sustainable urban development rather than a sustainable city. Otherwise one is compelled to understand a city as a process not as an object. Many recent writings about sustainable built environments discuss sustainable cities as if they were objects. Moreover, the distinction between what is a sustainable city and what should be a sustainable city is not always clear.

How can one describe what a sustainable development is in urban areas, when there is a continual transformation of urban cultures and economies, and when built cities are under continuous transformation? If one preserves an existing situation with high living qualities in cities, is it then sustainable when more and more people move into cities and the world's population increases? What are the effects then? Thus urban sustainability has to concern continuous transformation processes of economies and cultures where their impacts on the environment - either built or natural - can be understood as a product. And can the impacts on the product encourage a certain kind of behaviour, both socially and economically? At least descriptive approach to urban sustainability is a two sided topic, where one aims to understand the impacts of social and economic activities on the built environment and conversely in which way the built environment conditions - be it necessarily or sufficiently - a certain kind of economic and social behaviour. In whatever way urban sustainability can be understood, these processes have to be taken into consideration.

5 The compact city and the density problem

There are numerous writings on urban areas and their sustainable development. Most of them set out as a criticism on Le Corbusier's Radiant City model, Ebernezer Howard's Garden city model, Frank Lloyd Wright's individualistic dwelling model and general post war planning. These kinds of anti-urban city models and planning are recognised to contribute to separation of functions and simplification of urban areas. What all these writings search for is an understanding of the compact city model, which is recognised to encourage sustainable ways of living and low energy use for transportation. Generally speaking, urban sustainability is thus accounted for in terms of compactness. In one way or another, a city's compactness is taken to condition a sustainable urban development. In essence this contribution is intended to render this thesis somewhat more precise. At least the following features are recognised from recent writings to be essential to compact cities:

- **Physical aspects:** High density of the built mass in central areas and sub-centres pedestrian friendly streets, and clear demarcation on what is public and private space.
- **Functional aspects:** Dense location and mixed use of dwellings, work, services, retail and shops in urban areas, short movement routes between facilities, pedestrian friendly, dense concentration of people, and an intensifying of human activities in the urban centres.
- **Social aspects:** Low criminality, mixture of people of different class and race, healthy and good dwelling areas, safe streets, possibilities for natural social contact between inhabitants and visitors.
- **Economic aspects:** Vital centres and sub-centres and a mixture of small and large enterprises in urban areas.
- **Environmental aspects:** Reduction of energy use, new development on recycled land, and reduction of low-density urban sprawl in the countryside.
- **Political aspects:** The ways in which governments on the local, regional and national level should act or not in order to encourage sustainable development rather than the opposite.

Is then the compact city a product of urban sustainability? Or is urban sustainability possible in terms of compactness? Initially, compactness is a topological term. In a very loose and scientific way of speaking compact is what is closely and firmly united, pressed together, dense, fine grained and packed into small space. In addition to quantitative aspects, the qualitative, economical and aesthetic aspects of the term are thus mentioned. Even in the light of these preliminary suggestions at least two hypotheses may be proposed:

1. An urban development is not sustainable unless the city in question is compact. Thus, compactness of urban environments is a **necessary** condition for the sustainability of their development.
2. Compactness guarantees sustainability. It is a **sufficient** condition for sustainability.

Is then urban compactness a sufficient condition or a necessary condition for sustainability? Or is it neither - nor? So far, it seems difficult to make statements on urban sustainability, because a concise definition of urban compactness is missing in recent writings. Presumably urban compactness can contribute to a certain kind of sustainable human behaviour but in what way depends on what is meant by compactness.

According to the Brundland report, one of the basic environmental problems of modern cities is high energy use for transportation - generally speaking car dependency. Does this relate to the **structure** of an urban network? Public spaces between buildings are potential movement routes from everywhere else to everywhere else. The way functions in an urban grid are dispersed must to a substantial extent result from potential movement routes in these public spaces. Apparently, density and mixture of activities first and foremost depend on the structure of an urban street and road grid. Degree of accessibility is at issue. Car dependency is one of the issues illustrating the technological complexity debates on urban sustainability presuppose. The subsequent account of compactness will reckon with this precondition.

On the other hand cultural interaction and physical movement certainly shape a built environment. There is interdependence between the physical built environment and economical as well as socially motivated movement. Thus, physical form and cultural activity influence each other. Urban compactness thus should be understood in terms of movement and interaction.

How is it possible to find out whether compactness is a necessary or sufficient condition for urban sustainability given that concepts of urban compactness are imprecise? Even though recent writings on urban compactness have indicated to some extent what a compact city might be, the concept of density is still vague and the concept of the structure of a street grid unclear. If compactness basically is a topological term, it certainly makes sense to use topological consideration in order to understand urban compactness. The following section will set out in what way a configurative approach can offer a more concise account of compactness.

6 The configurative approach

An account of compactness and sustainability in morphological terms has to be descriptive. It concerns both structural and social aspects. While Chistopher Alexander concentrated on structural aspects (Alexander, 1966) and while Jane Jacobs accounted for social aspects (Jacobs, 2000), a configurative approach offers mathematical means to reconsider them jointly. Compactness is then understood in terms of space. Urban space can be approached topologically as well as geometrically. As will be argued subsequently economic and social issues favour a topological approach.

From a configurative point of view, a city is conceived as a set of spaces. Urban space is mostly linear. It consists in mostly streets, alleys, roads, boulevards, highways, which in contrast with squares, are linear items. Spaces of these kinds can be represented by a set of axial lines (Hillier 2001, p. 02.1). If one represents an urban grid with the set of the fewest and longest axial lines one gets an axial map. It is then possible to calculate their interrelationship, in particular their topological distance from one another. The results can be compared with a variety of other numerical data expressing social activities such as movement, land use pattern, and distribution of crime. Thus spatial and social factors can be correlated with one another.

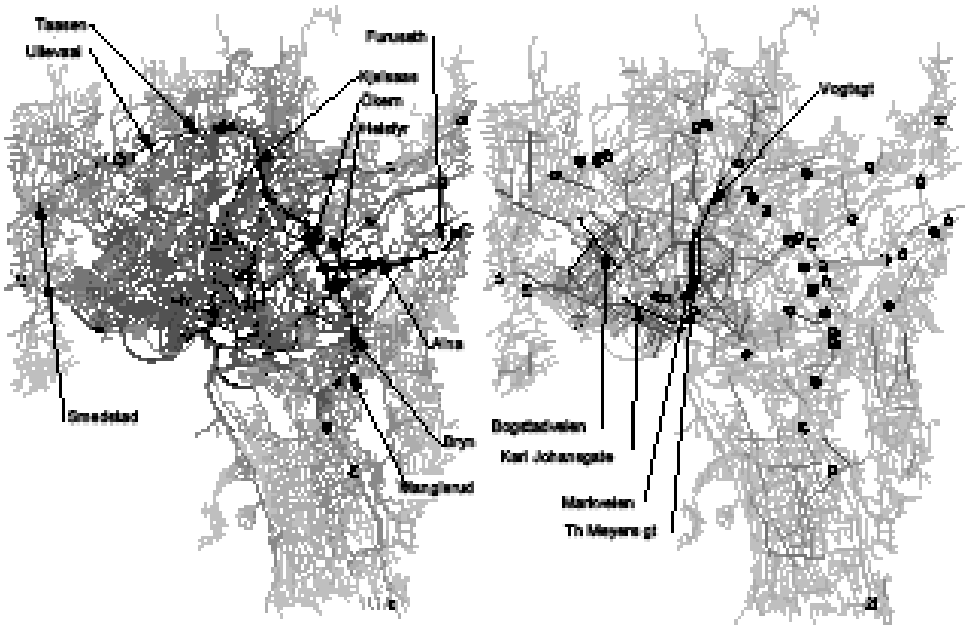
Three aspects of spatial configuration can provide an understanding of lively urban areas and illustrate the configurational inequalities responsible for attractional inequalities in an urban grid: spatial integration, spatial segregation and spatial connectivity. The next section will discuss these aspects more precisely in light of the question of urban compactness and urban vitality.

6.1 Explaining economic activities in urban areas

If urban sustainability consists in encouraging the location of economic activities in city centres, one has to understand how shop and retail locate themselves in vital areas in urban grids. These kinds of economic activities depend on potential movement patterns and optimal strategic places in an urban network.

Research carried out by Hillier and his colleagues have shown the following results: First of all, shops locate themselves in streets where most people move. Apparently, shops tend to become attractors for the people's urban movement. Attractors and movement may influence each other, but they do not influence the configuration of the urban grid. On the other hand, the grid seems to influence movement and attractors. The dispersal of global and local integration and connectivity is decisive (Hillier et al. 1993, p. 61). This is known as the theory of the natural movement economic process.

Figure 6.1 *Global and local integration of Oslo 1999.*



In the author's PhD thesis *Road Building and Urban change*, the following discoveries were stated: Global integration indicates where the globally most integrated roads or streets are located in a city on a meso scale. It shows the most vital areas. However, whether it is a vital city centre with shops and retail or not depends on the main street's degree of connectivity to its vicinity. Figure 1 (left) illustrates an example on global integration of Oslo in 1999. The black lines show the most globally integrated roads and streets. These lines have relatively simple routes to all other lines in a system. In this case it is located on Oslo's ring roads. By measuring the average topological depth of a city's street grid one gets the radius for calculating its local integration. Local integration indicates vital local centres. Figure 6.1 (right) illustrates an example on local integration in Oslo. In the case of Oslo, the pedestrian based shopping areas are situated along the locally most integrated streets, while the car-based shopping centres are situated along the junctions of the globally most integrated streets (van Nes 2002, p. 211).

How can a grid's configuration decide upon how people move by foot or by car? Local integration conditions the location of successful pedestrian-based shopping areas. It often is indicated by a dense structure on the street grid in the vicinity of a shopping street. Shops have a linear location pattern along the most locally integrated streets, while they tend to be clustered in a form of a shopping centre at the junctions of the most globally integrated roads. Thus indication of a successful vital shopping and retail area which is pedestrian based requires a strong local and global position in an urban grid (Hillier 1999, p. 107-109). If urban growth changes the integrated core, either on a local or a global scale, the optimal location for profit maximising is affected. In order to survive in a competitive environment, shop and retail owners will always search for the optimal location in order to reach potential customers. Thus creating a vital city centre and sub-centres calls for an account of their global and local location in an urban grid and the respective degrees of inter-connectivity to their vicinity. A street grid's degree of density affects human movement on foot or by car. Seemingly, a globally integrated street net with poor connections to its vicinity encourages car use.

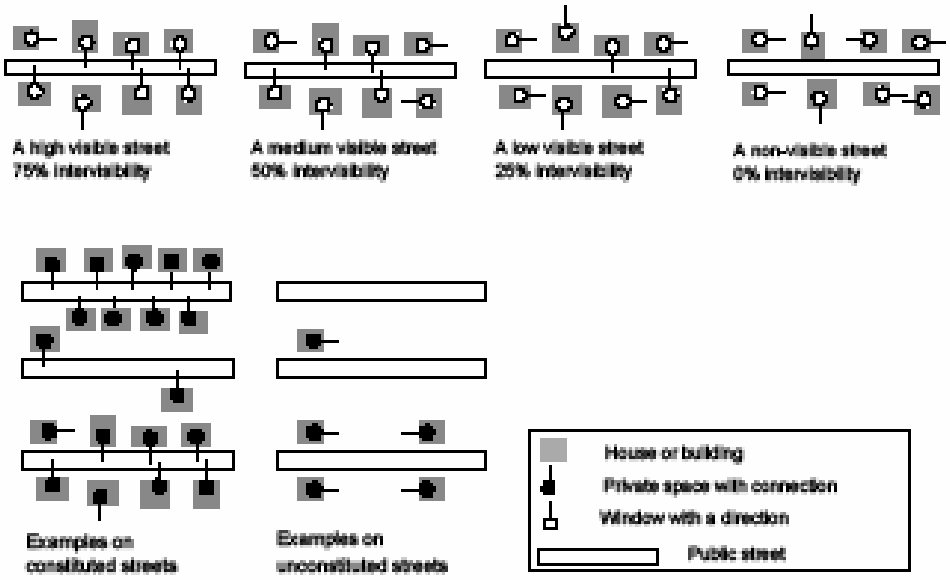
6.2 Understanding anti-social behaviour in urban areas

How do these considerations pertain to segregated areas with low integration and connectivity values? As Richard Rogers, Jane Jacobs and Peter Calthorpe suggest, one of the aims of repopulating city centres is to provide safe central areas where streets are free from crime and anti-social behaviour. In the previous section integrated urban areas were discussed. Research concerning economic rationality allows for a certain degree of predictability of the locations of economic activities. However, research on very segregated urban areas contributes only to an understanding on the interrelationship space and possibilities for crime. It requires studying initially established areas. At issue is the way in which spatial organisation can disturb the natural relationship between inhabitants and strangers in urban areas.

In general segregated streets have more complex routes to all other streets in a city. Empirical research with a configurative approach shows that areas with segregated spaces, with urban grids visually broken up and with few dwelling entrances constituting streets are often affected by crime and social misuse (Hillier and Shu 2000, p. 232). The same investigations prove that spatial organisation can generate movement according to co-presence and co-awareness in the built environment.

Throughout the urban design practice the last century, the relationship between the private space and its relationship to the public realm has decreased by architectural modernism and the *defensible space* concept of Oscar Newman (Hillier and Sahbaz 2005, p. 453). Therefore, spatial topological analyses tools were developed on a micro scale urban level in order to invest and improve spatial analysis methods on the topological relationship between private and public space, such as inter-visibility of windows and doors, how density of doors to streets plays a role and the degree of visibility from windows to parking lots. Figure 6.2 shows a diagram on these kinds of micro scale spatial relationships. As the results from this inquiry shows, these micro spatial factors correlated with the macro ones influence the street life and dispersal of burglaries in built environments (van Nes and López 2007). It seems all to be dependent on degree of adjacency, permeability and inter-visibility on different scale levels. With other words it is about how neighbours get the spatial possibilities to keep an eye on each other, how a street's topological structure can generate a natural mixture between inhabitants and visitors for natural policing, and the topological spatial potentialities for crime opportunities.

Figure 6.2 *Diagram showing a street's various degrees of inter-visibility and constitutedness on the relationship between private space inside buildings and public space.*



Micro spatial topological relationships are dependent on the macro scale ones when studying street life and degree of safety. Figure 6.3 shows how a street's relationship to a city's main routes system affects burglary rates. The main routes are identified through an angular segment based integration analysis with a radius like 3. Every time one changes direction from the main routes, it is accounted as a topological step. As can be seen in the figure, most burglaries take place in topological deeply located streets. Furthermore, the most affected streets tend also to be unconstituted by entrances, low inter-visibility between houses and streets environments (van Nes and López 2007).

Causes for social misuse of a given area can thus be understood from a topological spatial point of view. It depends on at least the following conditions: Bad correlation between connectivity and local and global integration of the vicinity, the segregated areas are many topological steps away from integrated streets or main routes, and the topological spatial structure in the area is deep, in itself and as regards to the whole system. Likewise spatially enclosed systems with high privacy, but without general social control lack natural co-presence and mutual surveillance (Hillier 1996, p. 188, 194 and 201).

Figure 6.3 *The topological depth from main routes in Alkmaar and the dispersal of burglaries*

The design of architectural space can thus affect the use of space. This issue seems to touch upon the problem of architectural determinism, i.e. the question to what extent one can predict how urban areas will function after their construction. It is difficult to assess the question to what extent a configurative approach is a form of architectural determinism. Whether crime or social malaise will occur in spatial segregated areas or not naturally depends on the behaviour of their inhabitants. A configurative approach, on the other hand, can answer the question why some areas have a high level of crime and social misuse. Thus a configurative approach can prove that the spaces of a built environment can affect human behaviour (Hillier 1996, p. 184 and 212). It makes one understand that the means a built environment offers are physical while its ends are functional - not visa versa.

7 Urban compactness in configurative terms

The following examples will demonstrate how a compact vital city can be described in a concise sustainable manner. In his book *Towards an Urban Renaissance* Richard Rogers' tries to illustrate the relationship between a compact city centre and its sub centres in a diagram (Rogers 1999, p. 53). Compact urban centres are indicated as dark circles in a grey scaled built environment. The darkest colours indicate high urban compactness. In what way these centres are compact is not clear. The finer spatial content inside these circles is missing. It does not say how these centres can function socially and economically in a sustainable manner. Likewise, a concise understanding of the way each centre relates to their surrounding areas and the whole city is lacking. In general, the fine-grained street grid and its inter-connectivity are not taken into consideration at all.

Figure 7.1 *Density of the street grid in shopping areas in Oslo.*

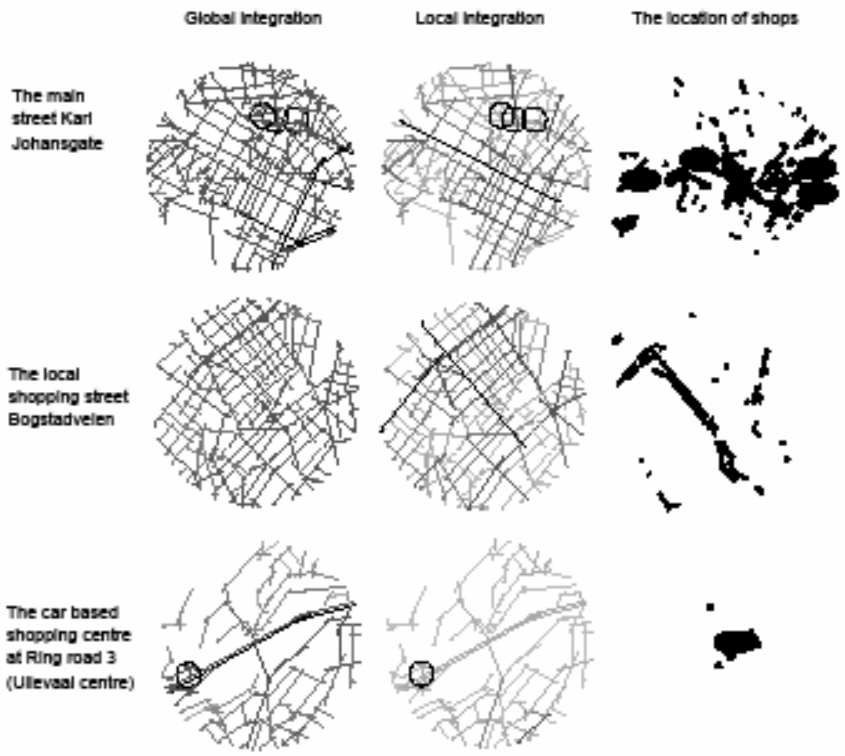
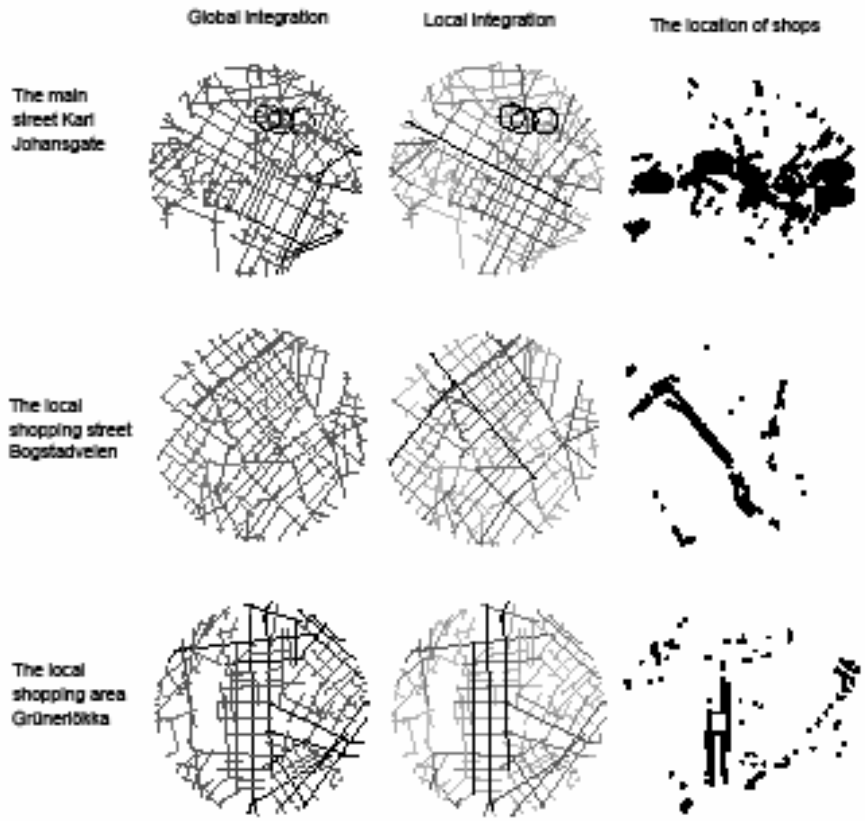


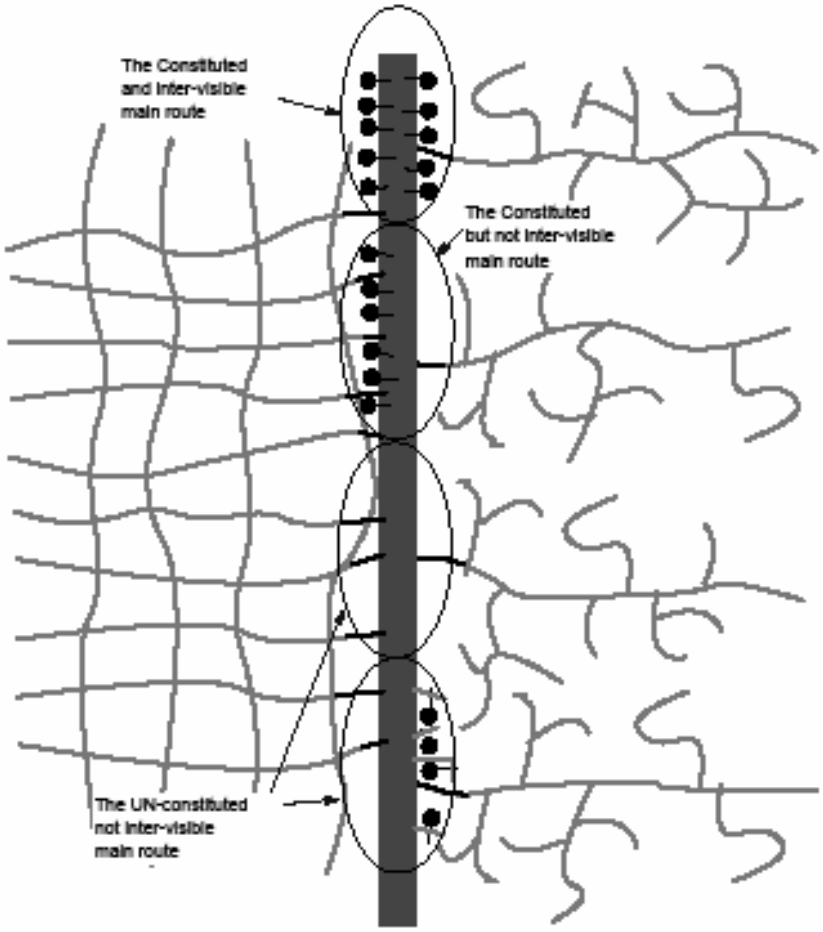
Figure 7.1 shows the street grid of the two main pedestrian-based shopping areas and one car based shopping centre in Oslo within a radius of 1 km. The areas' location patterns of shops are shown at the right side of the figure. The black ovals indicate large shopping centres. The pedestrian-based areas have in common providing a dense street grid within a short metric distance. This is an indication for compact sustainable urban areas. The local integration and the density of the street net are low in the car-based shopping centres located at the globally most integrated ring road 3. It does not encourage movement by foot. Hence, criterions for successful compact pedestrian-based urban centres imply high density of the street grid in a short metric distance and inter-connectivity between local streets, main routes streets and the road net of the whole city.

Figure 7.2 *Degree of urban compactness in Amsterdam and London*



By looking at other cities with compact centres, the same features can be seen as in the case of Oslo. In Amsterdam, as shown in figure 7.2, the area around the central station has low global integration values, while the main shopping streets have both high local integration and high density of axial lines. The relationship between the main routes and the local street grid are well connected around the Dam square area. Conversely, at the ZuidAs area at Amterdam's ring road the global and local integration is high, but the connectivity and density of the street grid is low. Moreover, the inter-connectivity between main routes and the local streets are low. Urban centres with a street structure of this kind seem to encourage car use. In the case of the City of London, the global integration is high, local integration is moderate, the density of the street grid is high and has a high level of inter-connectivity between main routes streets and the local street grid.

Figure 7.3 *Diagram showing the relationship between building entrances and the main routes*



Seemingly, degree of accessibility and inter-connectivity on various scale levels are essential for encouraging sustainable means of mobility, street life, and safe urban areas. In order to reveal this, the diagram in figure 7.3 is used as an example. The diagram represents a built environment with a main route through it with a “tree structure” on the right side and a network structure on the left side. Along the main route, some building entrances are represented as dots. The diagram show different ways how private and public spaces are inter-connected to one another on various scale levels. The “tree structure” street grid is poorly connected to the main route and seemingly generates private car use. Conversely, the network structured street grid is well connected to the main route and apparently generate pedestrians in streets. In order to illustrate the topological relationship between private and public space on an urban micro scale level, entrances are represented as black dots with a tail connected to streets in different ways. When an entrance is directly connected to a street, it constitutes the street. High density of entrances does not imply high inter-visibility. It depends on how they are located opposite each other. As research has shown, entrances’ degree of inter-visibility and constitutedness affect street life and crime dispersal (van Nes and López 2007).

8 Environmental configurative considerations

How can these findings on connectivity, global and local integration provide an understanding of urban sustainability when cities, their cultures and economies are continuously expanding and transforming?

At least since the industrial revolution we have seen in what way comprehensive technical inventions affected the spatial structure of built environments, and conversely its spatial product affected social and economic behaviour. Man is able to change its built environment and has purposes and intentions to do so. It is not always clear what the intentions are, but those concerning economic activities strive for profit maximising. Aiming at the creation of urban areas developing in a sustainable way can not ignore the behaviour of producers and consumers and the way the built environment influences them. From a configurative point of view, understanding what an urban area's sustainable development consists in depends on an according account of the topological structure of its street and road grid and the topological spatial relationship between private and public space.

It is not enough encouraging high density in urban areas by increasing the number of dwellings and locales for economic activities or in general high density of the built mass. It is the density of the grid and its local and global position in the whole system that are at issue. Density of lively dwelling areas seems to be a by-product of the high density and inter-connectivity of the urban grid and the dispersal of integration values on it. The degrees of connectivity of a street and its configurational position in a city influence the relationship between inhabitants and visitors. In what way an area has mutual surveillance or not can be understood from a spatial point of view. The natural mixture of inhabitants and visitors is a criterion for safe urban environments and makes living in urban areas attractive.

To the extend that urban compactness can be understood in configurative terms, the relevance of compactness for urban sustainability can be assessed more adequately in morphological terms than in other less formal terms. For a configurative approach conceives the built environment descriptively as a process rather than a product. It assesses in what way economic and social behaviour are influenced by it and, conversely, have influence upon it. Seemingly, urban compactness is a necessary condition for a sustainable urban process in terms of high degree of inter-connectivity of the street grid and the way it is connected to the whole city on local and global scales. Compared with many other accounts of urban sustainability, a topological approach can offer specific concepts of spatial and functional aspects in order to explain or understand compact cities and their effects on economic and social behaviour - whether it turns out to be sustainable or not.

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Differing comprehensions of important aspects in land use and transport planning as explanation to production and adoption of plans resulting in growth in urban car transport volumes

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May 22, 2007

1 Background

Sustainable development is a multifaceted notion with many possible definitions. We take as our basic starting point the sustainable development definition as spelled out by the Brundtland Commission who said that human activity must take place within the planet's ecological capacity to cope with the exploitation of resources, emissions and pollution, and that global development should be more fairly distributed in terms of both time and space. It follows from this that sustainable urban development in Western towns and cities will often revolve around changing human activity in order to reduce consumption of non-renewable resources, to sustain biodiversity as far as possible and to reduce climate gas emissions considerably. Translated into everyday urban planning[1], this means that land uptake and traffic volumes (transport requirements and car use) because of new urban developments should be minimised. In this paper we focus on reducing urban car traffic volumes.

Reducing (growth in) urban car traffic volumes is a long-standing political objective in many cities and countries, in Norway this objective is found in most steering documents on all political and administrative levels (Tennøy 2004a). The arguments have varied through the decades, but concern in a nutshell the desire to curb the negative impact on the local and global environment, improve road safety, improve health, make cities more liveable, and achieve cuts in public spending. In this paper, we will discuss reduction of (growth in) urban car traffic volumes mainly as a means to reduce CO_2-emissions, in order to achieve a more sustainable urban development.

There is seemingly a relatively widespread consensus on which means are needed in order reduce urban car traffic volumes. These are (Samferdselsdepartementet 2004, Strømmen 2001, European Commission 2001, Næss 1996, Newman and Kenworthy 1989, Owens 1986):

- to impose physical and fiscal restrictions on car traffic
- to improve public transport services and the conditions for walking and bicycling
- to avoid urban sprawl, and to impose a land and transport reducing spatial development

These means are to a high degree controlled by public authorities and politicians. They are making plans and decisions about development of the road systems, the land use development, parking restrictions, public transport services, road pricing, infrastructure for bicycling, location of new buildings and activities, design of urban areas on micro level and most other means that affect development of urban car transport volumes.

[1] By the term 'urban planning' we here mean land use and transport planning in urban areas, mainly at macro but also at micro level.

Still, as things stand, many of these means are not implemented to full advantage. On the contrary, in Norway urban road system capacity is undergoing expansion, the pace of development of public transport facilities are not keeping up with improvements in car traffic facilities, development of infrastructure for walking an bicycling is developing slowly, urban sprawl and "wrong location" of operations are allowed, and car use is rising too. From 1980 to 2000 the number of car trips increased with 74 % in Norway, while the number of public transport trips (except plain) remained almost the same. In Oslo and the surrounding county Akershus, the population growth in the period 1990 – 2000 was ca 12%, the growth in work places was ca 13 %, the growth public transport was 18% while the growth in car transport was 37% (Statens Vegvesen 2006). There is indeed a gap between intentions and reality.

2 Theoretical background

Some brief knowledge of historical and theoretical background is necessary as basis for the further discussions. Traditionally, transport problems have been tried solved by building new roads and more road capacity. The theory behind this is that new road capacity will improve traffic flows, and thereby reduce pollution and time spent on transport. Not increasing road capacity would result in traffic chaos as the traffic keeps growing due to population growth, growth in economic activity etc.

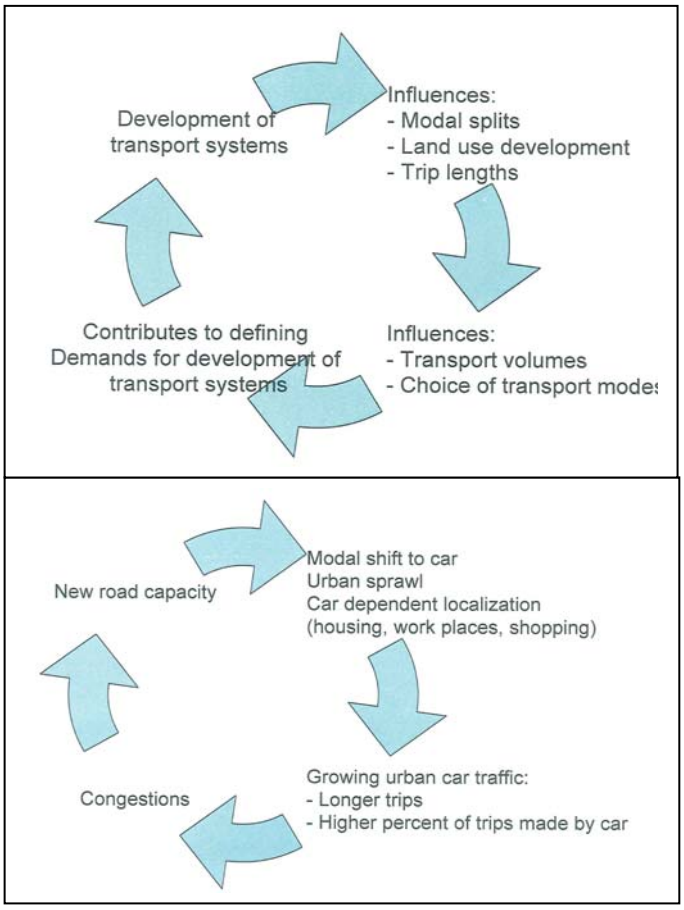
Figure 2.1 *Traditional and static theoretical model.*

Theories opposing this view have been developed for more than 40 years. A basic assumption for the alternative theories is that in urban areas with high car density and pressure on transport systems, there is a latent market for car traffic. Increased road capacity in such situations will improve the attractiveness and competitiveness of the private car, and result in modal shifts from public transport, walking and bicycling to private cars, to more and to longer trips (SACTRA 1994). This is both a result of the car becoming a more efficient transport mode than other modes as travel time by car is reduced, but also that increased road capacity and reduced travel time allows and stimulates to an urban land use development that in the longer term results in growth in urban car traffic volumes. As travel time is reduced, people can move further away from the central urban areas, and they can choose living area and work place demanding longer trips. Making their travels dependent on the private car, they can do such choices independent of public transport facilities, or the possibilities to walk or bike on daily trips. This results in urban sprawl and a more car dependent spatial structure of the city, which in turn results in a more car-based lifestyle and increased urban car traffic.

As the process of growth in urban car traffic continues, new road capacity is filling up, travel time increases and the growth is stagnating. According to Downs (1962), the growth in traffic will continue until congestions etc. make the attractiveness of the car similar to that of public transport. If congestion increases beyond this level, the attractiveness of car traffic will drop below that of transit and in its turn cause motorists to change to transit. The most efficient way of reducing travel time for all is, thus, to reduce travel time on public transport systems. This of course implicates a considerable field of competition between various transport modes. Increasing road capacity in congested conditions will, according to Mogridge (1996), only increase car traffic

volumes, not speed of the traffic, and thus be counter productive. Cairns et al (1998) found that reducing road capacity is also reducing car traffic volumes, and without noteworthy traffic chaos.

Figure 2.2 *A more dynamic way of understanding cause-effect relations in spatial development, development of infrastructure systems and development of urban car traffic volumes.*



This way of understanding urban transport systems and the cause effect-relations in land use and transport systems, is opposed by others which claim that there is only a small or negligible field of competition between the private car and other modes of transport. The ones owning a car will use it no matter what the conditions of the various transport systems are, while only people that for some reason can not buy or drive a car will use public transport. Improvements of public transport systems will thus not have impact on neither the car traffic volumes nor the modal split. In this understanding of the systems, development of transport infrastructure is not affecting land use development in ways that causes modal shifts or the length of trips.

Even if this theoretical discussion has been going on for decades, it has had a progression (Macket 1998). Previously, a simplified understanding of how the land use and transport systems are interlinked was dominating, where the level of car traffic was seen relatively independent of development of transport systems and the land use, and where road construction was not seen as problematic. These days, one is more aware of the dynamics

of the levels of car transport, and how this is related to the quality of various parts of the transport systems as well as the how land use is developed. This also means that building new road capacity as answer to urban traffic problems is increasingly seen as more problematic. The strategies are now turning towards trying to find ways to keep up mobility without increasing car traffic (Owens 1995).

Results from previous work, mainly based on theory studies and case studies, has made us wonder to which degree new knowledge and changed attitudes is known and accepted among those making and adopting plans affecting urban land use and development of urban transport systems (Tennøy 2004 a, b). If important actors are not aware of or agree on important cause-effect relations in land use and transport planning and development, and how this affects urban car traffic volumes, this could be an explanation why plans are made and adopted, that result in growth in urban car traffic.

3 Approach

Our research question is: How and why are planners making plans and politicians adopting them, that according to generally accepted scientific understanding on the correlations between urban land use development and transport development, and growth in urban car traffic volumes, result in more urban car traffic – despite clear aspirations to reduce urban car traffic growth?

We have in previous studies defined a number of possible explanations (Tennøy 2004);

- Conflicting objectives and values
- Disagreement/uncertainty on effects of various means
- Knowledge and lack of knowledge among important actors
- Focus in planning
- The politicians' rationality and the rationality of politics
- The planners' rationality and the rationality of planning
- Lobbying
- Institutional and organisational factors
- Use of transport models in urban planning

In this paper we will focus on the first three points, asking if differing comprehensions among politicians and among planners of important aspects in urban planning may be part of the explanation why plans are produced and adopted, that results in growth in urban car transport and thereby a non sustainable development.

4 Methodology

The paper presents and discusses results from two surveys on comprehension of ends and means in urban land use and transport planning (Tennøy 2005). The first survey was carried out among local politicians in three municipalities (Bergen, Oslo, Bærum) located in the two largest urban areas in Norway (Bergen and Oslo). The other survey was carried out among planners, transport planners and other relevant professionals in the largest Norwegian urban areas (Oslo, Bergen, and Trondheim). We will also use results from previous studies done within the same project.

Both questionnaires were distributed in November and December 2004. We sent questionnaires by mail to all members of the councils in the municipalities Oslo, Bærum and Bergen. Oslo and Bergen were chosen because they are the two largest municipalities and cities in Norway. Bærum was chosen as a municipality in the Oslo city system, but with a distinct different approach to land use and transport strategies from Oslo. The tension between Oslo and other municipalities in the county surrounding Oslo (Akershus) is interesting when discussing land use and transport planning and development of urban road transport, in the Oslo city system (but this will not be discussed in this paper). The response rate among politicians was 41 %. Total anonymity made reminders impossible. The respondents in the questionnaire among politicians seem to be fairly representative. There is some overweight on the left wing side, while the right wing side is to some degree underrepresented. Oslo is slightly underrepresented compared to the other municipalities.

Distribution of questionnaires to relevant professionals was not as easy as to politicians. We tried to reach relevant professionals through e-mails, sent to a long list of people at planning departments, road departments, consultants, research institutions etc., with a call to forwarding the questionnaire to other relevant persons in their network. This worked somehow, and we received 82 questionnaires from professionals. We cannot say if we have a representative sample of professionals, since we don't know how "the universe of relevant professionals" looks. We found the most typical respondent to be a male civil engineer, aged 31 to 50 years, working with land use and transport planning for a public authority in the Oslo-area.

We carried out rather simple statistical analysis, frequency distribution, cross tabulation and some regression analysis, using the tool SPSS. These were used in various comparative analyses.

5 Discussion of findings

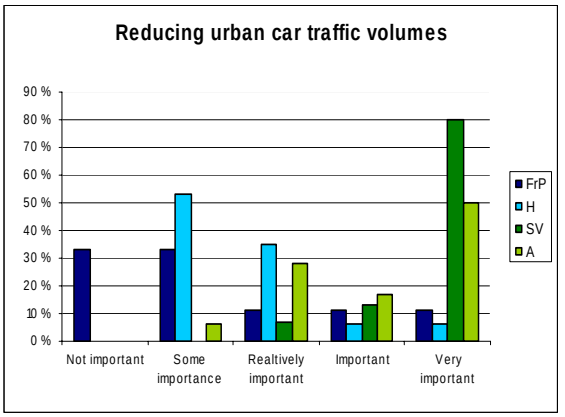
5.1 Conflicting objectives and values

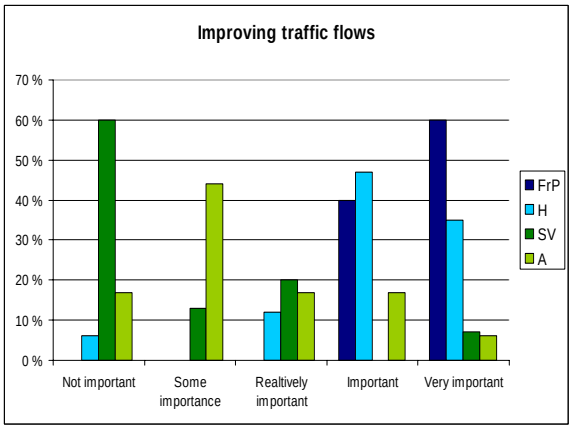
Reducing (the growth in) urban car transport is found as an objective in all kinds of steering documents on various administrative and political levels. But do politicians and professionals find this to be an *important* objective? In the survey, 51% of both the politicians and the professionals answered that reducing urban car traffic is important or very important. Among ten objectives in urban land use and transport planning, politician found reduction of car traffic to be the seventh most important.

Closer studies revealed a political division, where (maybe not unexpected) the left wing parties (in this analysis we counted in The Labour Party (A) and The Socialist Left Party (SV)) expressed that reducing urban car traffic is an important objective, while the right wing parties (here counted The Progress Party (FrP) and the Conservative Party (H)) found this less important. Among the professionals, reducing car traffic was rated as the seventh most important objective of nine (not the same as the politicians chose between), while concretizing of this objective (to reduce greenhouse gases, reducing local pollution etc.) was rated more important. When we ask the professionals if reducing urban car traffic should be and important political objective, 78% says yes.

Conflicting objectives could be an explanation why plans are made and adopted, that result in growth in urban car traffic volumes. Other objectives could be more important than to lead a traffic reducing strategy in land use and transport policy. In the survey, more politicians expressed that conservation of green areas, of the architecture and the character of the city are important, than that reducing urban car traffic volumes are. These objectives could thus be conflicting with means for reducing traffic volumes. The conflict would exist most distinctly in the discussion about densification rather than urban sprawl as the strategy for urban growth, since densification may threaten such values. Better-flowing car traffic is apparently not a conflicting objective, since we found that reducing car traffic is ranged higher than improving the flow of traffic among politicians. Closer examination shows that the right wing side is prioritising improvement of traffic flows, while the left wing side gives priority to reducing car traffic volumes. Better-flowing traffic and reduction of car traffic volumes are thus conflicting objectives; one could say that this is the political water shed in these questions. Among professionals, local environmental issues such as shielding living areas from traffic, reduction of local pollution and of physical barriers are rated more important than reducing the urban car traffic volumes and reducing greenhouse gas emissions. This could be understood as professionals prioritising the local before the global environmental issues.

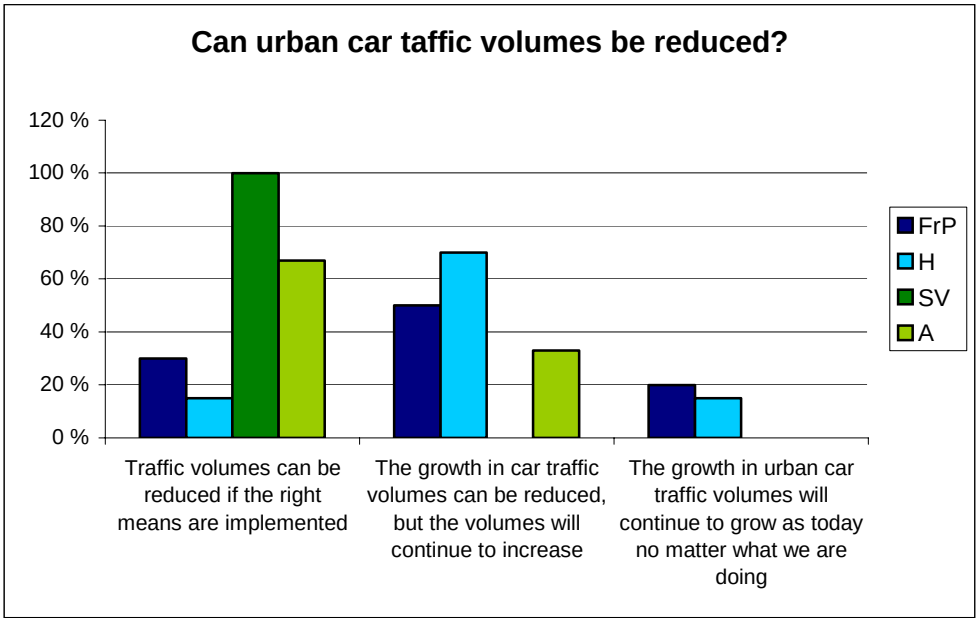
Figure 5.1 *Reducing urban car traffic volumes and improving traffic flows could be seen as the political water shed.*





In discussions about the objective "reducing car traffic" it is important to clarify what is really meant. It could mean to actually reduce the total traffic volumes in numbers of kilometres travelled by car per day, but it could also mean reducing the steepness of growth curves for urban car traffic or that modal split should be changed so that car traffic accommodate a lesser percent of the total traffic volumes than before (but if the total traffic volumes are growing, all modes included, that could still mean that car traffic in absolute numbers is still growing). This can be perceived as trifling differences, but may have significant influence on which means that are recommended, adopted and implemented. If one expect traffic volumes to continue growing (even if not as fast as today), new road capacity is necessary in order to avoid chaos. If one expects (and wishes) reducing traffic volumes in absolute numbers, new road capacity will reduce the possibilities of reaching that objective, and would also be needless. Results from the survey show that a majority of politicians as well as professionals (56 and 61%) say that the traffic can be reduced if the right means are used, while a large minority (32% of the politicians and 35% of the professionals) answer that it is only the traffic *growth* that can be reduced, the volumes will continue to rise. Only a small minority (9% of the politicians and 2% of the professionals) answer that the traffic will continue to grow as today no matter what we do. Even if a majority of the politicians and the professionals state that the traffic volumes can be reduced, there is also a big minority thinking that the urban car traffic volumes will continue to grow.

Figure 5.2 *Politician left and right wings are disagreeing on whether the urban car traffic volumes can be reduced.*



We have thus found that even if a small majority answered that reducing urban car traffic volumes is an important or very important objective in land use and transport planning and politics, most other objectives are seen as more important. There are various views about the possibilities to reduce urban car traffic volumes. We also found that the conflicting objectives "improving urban car traffic flows" and "reducing urban car traffic volumes" could be seen as a political watershed. This clearly implies that conflicting objectives and values exist in land use and transport planning and –policy, and that this will cause problems when setting political strategic objectives.

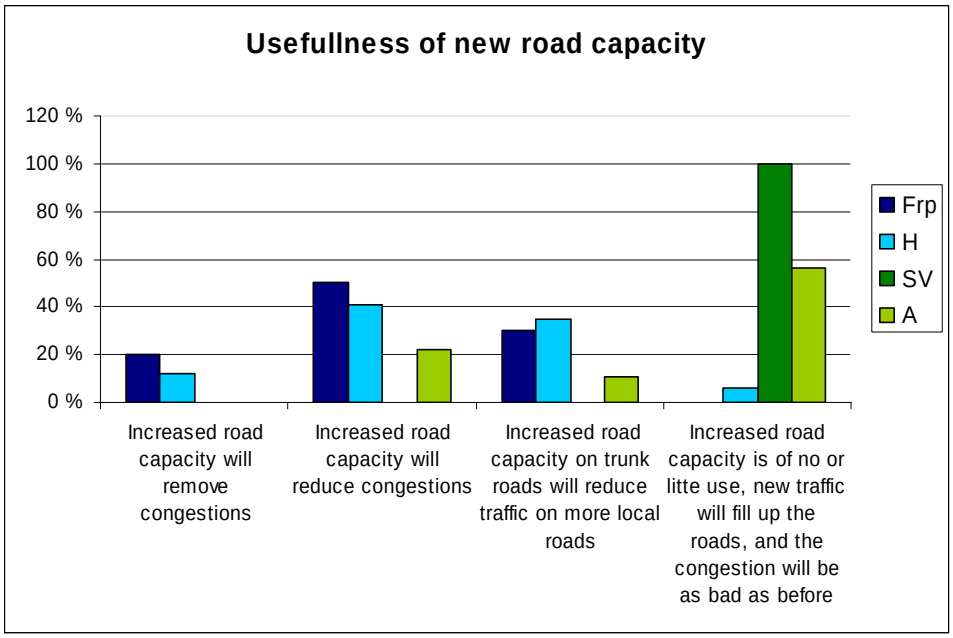
5.2 Disagreements and uncertainties on effects of various means

Our point of departure included the hypothesis that among professionals and informed politicians, there is a relatively widespread consensus on which means are requested in order to reduce urban car traffic volumes. Since these means are not implemented to a sufficient degree to have effect, we had to consider if the disagreements and uncertainties about the efficiency and effect of these means are more widespread than we thought. In the survey we found large spread in how efficient politicians as well as professionals think various means are in order to reduce urban car traffic. The exception is the mean "improving public transport services", which a large majority of the politicians as well as the professionals expressed that they think are efficient. The political border-lines are clear here as well. The left wing parties have higher believes than the right wing parties in the efficiency of almost all mentioned means. The right wing parties do not think that any kinds of restrictions are efficient in order to reduce urban car traffic.

We asked what the consequences of not building new road capacity are. The left wing politicians answered that even if this to a certain degree will cause congestion and chaos, people will to a large degree adapt to the situation by changing transport modes, choose alternative destinations or to travel at other times of the day. The right wing politicians

were more convinced that this will result in congestions and chaos. We found the same tendencies when asking about the usefulness of new road capacity. The answers from the professionals are varying. The tendency is still that the professionals believe more in people adapting, by changing modes etc., than in people continuing to driving their car no matter how bad the congestions are getting.

Figure 5.3 *Various comprehensions among political parties about the usefulness of increasing road capacity.*



When the politicians are asked if increasing road capacity or improving public transport services should be prioritised, the left wing parties are clear: the public transport systems must be prioritised! The right wing side is divided between prioritising building of new road capacity and to do both in parallel. Only few are willing to prioritise improving the public transport system before building new roads.

This shows that the comprehension of important cause-effect relations and effects of important means in urban land use- and transport-planning vary among different groups. Even if they did agree on the objective to actually reduce urban car traffic volumes, they would disagree on which means to use in order to get there.

5.3 Knowledge, attitude and theoretical understanding among various actors

Introductorily we draw the main lines of two different theoretical understandings of how developments of land use and of the transport systems affect urban car traffic volumes. In Theory 1, urban car traffic volumes are seen as relatively independent of the quality of transport systems (such as road capacity, conditions for walking and bicycling, public transport systems), that the field of competition between the private car and other modes of transport is small or negligible, and that land use development and the development of

car traffic volumes are not influencing each other to a substantial degree. In Theory 2, urban car traffic volumes are seen as dynamic, they vary considerably with the quality of the transport systems, and that there are strong interdependencies between transport infrastructure developments and land use developments, and between land use and car traffic volumes.

The answers to the survey give relatively clear indications where the respondents stand in relation to the two theoretical understandings, and could contribute to explaining why plans are made and adopted that result in growing urban car traffic. In our analysis we have divided the respondents in three groups; the left wing politicians (A, SV), the right wing politicians (H, FrP) and professionals. We divided the politicians in two groups because we knew they answer differently on important questions. Not dividing them could result in averages hiding important explanations.

As previously described, the left wing parties clearly express that they see reducing urban car traffic volumes more important than reducing congestion and travel time for the traffic by car, while the right wing parties have the opposite standing. The professionals are more focused on reducing environmental deterioration than on reducing congestion, and they seem to be more concerned by local environmental issues than of global ones. All three groups expressed that improving public transport services is the most important objective in land use and transport policy.

Whether one thinks that urban car traffic volumes can be affected by various means and strategies is an important difference between the two theoretical understandings. In the survey, the right wing politicians do agree on that urban road traffic volumes can be reduced by implementing the right means to a far less degree than the left wing does. The professional are divided in this question, but a majority thinks that traffic volumes can be reduced.

Such differences are also found when analysing how efficient the three groups find the various means to be, in order to reduce car traffic volumes, and in order to reduce congestion and travel time by car. We found that the left wing parties think that improving public transport services, steering land use developments and using fiscal and physical restrictions on car traffic contribute to reducing urban car traffic volumes. They think that restrictions on car traffic contribute to reducing congestions as well, but not that increased road capacity gives such effect. The left wing parties thereby say that urban car traffic volumes are affected by what happens in land use development and development of the transport systems.

The right wing side politicians are answering about opposite to the left wing parties. Neither improved public transport services, nor steering land use development or fiscal or physical restrictions on car traffic will reduce urban car traffic volumes. Increased road capacity will, in their opinion, reduce congestions and travel time. Neither physical nor fiscal restrictions on the car traffic will have such effect. The right wing parties find, by this, increased road capacity to be the only means (among the ones we asked about) to have any effect.

We could get an insight in how the various groups understand the cause-effect relations by asking what they think will happen if road capacity is not increased, and what will happen if it is. The left wing side expresses that they do not believe in chaos and congestions, but rather that people will change to other transport modes than the car etc., if capacity is not increased. They also find that increasing road capacity is not useful, since new car traffic will fill up the capacity, so that the congestions will become just as bad as before. The left wing side is by this signalling that they see urban car traffic

volumes as dynamic, and dependent on how the transport systems are developed and the land use evolving. The left wing side (of course) thinks that improving public transport services should be given priority before building new road capacity.

The right wing parties are answering the opposite. If road capacity is not increased, chaos and congestions will worsen, since people are not changing to other modes etc. Increased road capacity is useful, by removing or reducing congestions and delays, and by reducing car traffic levels on local and more vulnerable roads and streets. The right side here confirms their attitude to car traffic volumes being static in relation to changes in transport systems or land use developments. The ones driving a car will continue to that no matter how bad the congestion gets or how good the public transport systems are becoming, while the ones using other modes continue to do that independently of changes in the transport systems. The right wing politicians will not prioritise improving public transport services before improving road capacity.

The professionals seem to be divided in this question. As group they answer that if road capacity is not increased, neither congestions and chaos nor that people will change modes of transport will appear. They still believe in people adapting in various ways more than in chaos. When it comes to whether increasing road capacity is useful or not, the group is divided. 50% answered that new road capacity is not useful, since the capacity is filled up by new car and the congestions get as bad as before, while 50 % answered that new road capacity is useful in various ways.

Based on this analysis, it seems like the right wing politicians have an understanding of the cause-effect relations in land use and transport planning as corresponding to Theory 1, while the understanding of left wing politicians correspond to Theory 2. The professionals are leaning more towards Theory 2 than 1, but it seems like there are varying understandings of important cause-effect relations between professionals involved in land use and transport planning.

This discussion is summarised in the table below. A number of claims are put forward, that are reformulations of questions in the survey. If 0-20% agreed to a high or a very high degree, it says No! in the table. If 21-44% agreed to a high or a very high degree, it says No, and if 45 – 50% agreed to a high or a very high degree, it says No?. In the same way, it says Yes? if 51 – 55 % agreed to a high or a very high degree, Yes if 56 – 80 % agreed and Yes! if 81 – 100% agreed to a high or a very high degree. If 50 % agreed to a high or a very high degree, we have written Divided.

Table 5.1 *The table is summarising the analysis of which of theories 1 and 2 the attitudes of the three groups are corresponding to.*

Issue/question	Left Wing	Right Wing	Professionals
Is it possible to reduce urban car traffic volumes?	Yes!	No	Yes
The following objectives are important or very important:			
- Reducing urban car traffic volumes	Yes	No	Yes?
- Reducing congestion	No	Yes!	No!
- Improving public transport services	Yes!	Yes!	Yes!
The following means are efficient or very efficient in order to reduce urban car traffic volumes:			
- Improved public transport services	Yes!	No?	Yes
- Steering land use developments	Yes!	No	Yes
- Restrictions on road capacity and access to parking	Yes?	No	-
- More expensive to drive and park a car	Yes	No	-
- Less accessible or more expensive parking	-	-	Yes
- More expensive to drive a car	-	-	No?
- Limitations to road capacity	-	-	No
The following means are efficient or very efficient in order to reduce congestions and travel time:			
- Increasing road capacity	No!	Yes!	No
- Limitations to road capacity and parking	Yes?	No!	-
- More expensive to drive and park a car	Yes?	No!	-
- Less accessible or more expensive parking	-	-	Yes
- More expensive to drive a car	-	-	Yes?
- Limitations to road capacity	-	-	No!
Consequences of not building new road capacity will, to a high or very high degree, be:			
- Congestions and chaos	No	Yes	No
- Change of transport modes	Yes?	No!	No
Increased road capacity is not useful	Yes!	No!	Divided (50/50)
Improving public transport should be prioritised before new road building	Yes!	No!	-
Assessment	T 2	T 1	T 2?

From this analysis we can draw the conclusion that not everybody has taken in or accepted the new knowledge and understanding about dynamics of urban car traffic volumes and how they are interlinked with and vary with spatial development and development of transport systems.

6 Conclusions

Our research question is why plans are continuing to be made and adopted resulting in growth in urban car traffic volumes, despite clear objectives to reduce urban car traffic volumes, and apparently widespread consensus on which means are needed in order reduce urban car traffic volumes.

This study has showed that reducing urban car traffic volumes is not such a clear and important objective after all. There are disagreements about what the objective "reducing urban car traffic" means, and we found that other (conflicting) objectives are seen as more important by the majority. We also found that the conflicting objectives "improving traffic-flows for urban car traffic" and "reducing urban car traffic volumes" may be seen as a political watershed. The professionals are expressing much more concern for reducing car traffic than for reducing congestions, and they seem to be more concerned about local environmental impacts than about global impacts of growing transport volumes. This could result in professionals supporting projects giving local environmental improvements, but at the same time contributing to increase total car traffic volumes in the city. We thus find that conflicts in values and objectives probably are important explanation to why plans are made and adopted that result in growth in urban car traffic volumes.

The study has also shown that the consensus about which means to use in order to reduce urban car traffic volumes is not as widespread as we assumed. There are important deviations between the right wing parties and the left wing parties in the understanding of important cause-effect relations; how the urban land use and transport systems are interlinked and how they are affecting urban car traffic volumes. This in turn results in differing understanding about the effect and efficiency of the various means, as well as which side-effects they may have. Among professionals as well, one find that many still have an understanding of cause-effect relations that is neither accepting the dynamics of urban car traffic volumes nor how land use developments and development of transport systems are affecting changes in these volumes. All together this results in great difficulties in agreeing on if to work for reduced urban car traffic volumes, and in case, which means to use. The fact that professionals are disagreeing on these important cause-effect relations does not make it easier to arrive at a policy for reducing urban car traffic volumes, or to plans for implementing the necessary means.

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Akershus County Council

The initiative of a new toll ring in Oslo-Akershus

By Tor Bysveen and Thomas Tvedt

1 The toll rings are successes!

The transport infrastructure in the Oslo-region has undergone extensive investments since the mid 1980s.Major road and transport nfrastructure investments have partly been financed by a toll ring that was established in 1990. Two packages are set up. Oslopackage I is a road and car oriented initiative, while Oslopackage II is oriented towards public transport. The Goverment has covered 45% of the investments in the period 1990-2001. According to an evaluation made by Norwegian Institute of Transport Economics (TØI), the toll ring is a succes. There was a small reduction in car travel crossing the cordon toll. Traffic growth did come on the main roads and reduced traffic on smaller side streets. Traffic accidents are reduced due to reduced traffic in side streets. Accessiblity in the morning rush hours has increased, giving far better transport conditions for businesses and thereby the Oslo region is strengthend in the European and global competition..

1.1 Estimated growth in population and workplaces and a huge estimated growth in transport must be solved

The first toll ring will expire at the end of 2012. An estimated growth in population and workplaces by 20% in 2025 may occur Car traffic growth is estimated to a 30%. Local and regional politicians in Oslo and Akershus have agreed on a scheme for a new Oslopackage.

1.2 A unanimous proposition was delivered

A political steering group worked for 20 months, assisted by the municipality of Oslo, Akershus County Council and the national road authority.. The politicians came from the conservatives, progress party, the conservatives, social-democratic party and the socialist lefttist part. The politican wanted to make a strong cross-party proposal that will survive different political majorities for the next 20 years. Representing both right- and left-wing parties, compromises have to be made! And compromises were reached.

In general the social democrats and the left-wing party have compromised on the approval of major road projects. The main project is a priority of an 20 km underground motorway west to south of Oslo.The conservatives and the progress parties have compromised on using the road-tolls towards the running costs of public transport. There have been discussions among the politicians on projects and recommodations. But as the steering group puts it in there proposal: *In spite of the political polarisation, the group delivered a cross-party proposal.*

1.3 Four main goals were put forward

The main goals in the proposal are:

- To develop modern main road systems
- To bring forward the building of tunnels in order to reduce local noise and air pollution
- To relase areas for urban transformation
- To strengtend the public transport system through investments and running coast.

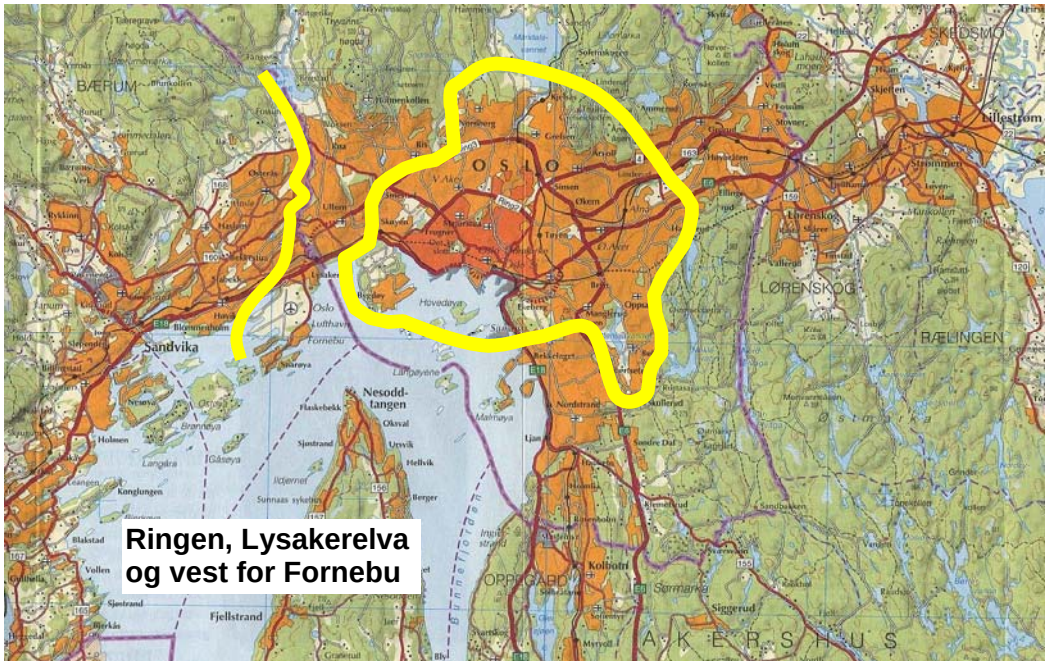
1.4 Introducing the Oslopackage 3

For the periode of 2008-2027 a package of 6,6 billion EURO is put together. Finances for rail infrastructure for 2 billion EUROS is external to the package. The national assembly (Storting) is supposed to contribute 1,5 billion EURO to road development, which is a presupposition of budjets in the National Transportation Plan. In addition the national authorities will contribute with approximately 2 billion EURO for railway development. Users of public transport will contribute with 0,25 billion EURO. The remaining 4,9 billion EURO will be collected from the road tolls. Almost 80% of the money for the transportations in the region is financed by the users, mainly by users of cars and a small contribution from public transport passengers. The initiative is the greatest financial plan for transportation in Norway ever!

1.5 Automatic electronic ticketing system means small administrative costs and traffic to run smoothly

Based on the electronic devise already in use, an automatic electronic system will be introduced, with manual tollbooths on the main roads The charges will be the same during the day, and is paid only in the direction of the city center. The charges will be 2,4 EURO for single passings, one-way payment 24 hours and 7 days a week. The locations are primarily the same locations as the excisting tollring. . In addition there will be another toll barrier in the municipality of Bærum.

The reason for another toll barier in Bærum is the regional balance of projects and investments, due to the 60/40% division of the income from the toll ring betveen Oslo and Akershus. There are three sub-regions in Akershus. Without an extra toll barrier in Bærum, this part of Akershus would get nearly 80% of Akershus share, because of the new main road E 18 westwards, calulated to 1.5 millions EURO. This sollution would not be possible to get acceptanse from the two other regions. A toll barrier in Bærum was necessary.



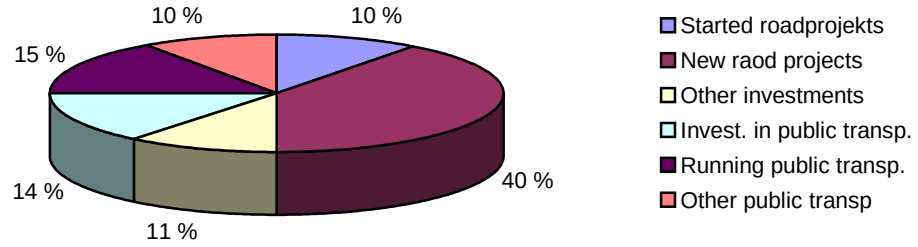
1.6 Using road tolls on public transport!

The initiative contains projects for roads, subways/trams/busses, new lanes, parking in transport nodes and traffic safety. New in Oslo-package 3, and very important, is the great transfer road tolls to public transport system. This was previously not legaly possible and a new law has to be passed. A change in the law is being proposed. The regional politicians have agreed meetings with the red-green majority majority coalition of the Storting to implement the initiative.

The initiative balances the projects between the different sub-regions in Akershus, types of projects and a tmetable of implementing the projects. During the first years the road tolls are spent on projects already planned.

The initiative creates a godd balance between road investment and public transport. For Oslo the balance is 45% on public transport and 55% on road investments. For Akershus the situation is reverse, 57% on public transport and 43% on road investments.

The package promotes major growth in public transport usages. In Oslo this will result in improvements in services and routes. The services for the public will be improved both on metro, trams, busses, trains and other public transport modes. It also provides finance to Oslo Sporveier, the company for public transport in Oslo, for investments in upgraded investments. For Akershus the inititiv will mean more departures and better comforts.



1.7 Coordination of the package and ordinary transport budjets is necessary

The initiativ's efforts in improving public transport will be coordinated with the ordinary services given by the state, Akershus County and the city of Oslo. The politicians stress that there must be made deals in order to make sure that money from Oslo-package 3 will not reduce other transportation.budjets in Oslo and Akershus. They also stress that the amount of money given by the state to purchase train services in the region will not be reduced.

1.8 Regional political control is demanded

The various projects in the package will be implemented during a 20 years periode. The politicical steering group underlines this necessity to solve the traffic and environmental challenges in the region. A shorter periode will have given higher passing charges than the group would recommend.

The steering group demands stronger regional political influence on decicions on transport investments in Oslo and Akershus than in the past. The intention with stronger regional influence is to strengthen:

- flexibility in the finance of projects
- coordination with other transportation projects and initiatives
- influence on the charges that regional politicians have initiatied

1.9 Preliminary evalutions are made

In order to cope with the estimated growth in road traffic, the region must implement a holistic transport strategy. The national authorities, the Storting, will only finance a smaller part of the estimated costs for a modern transportation in Oslo/Akershus. Preliminary evaluations of the effects shows:

- the initiativ will provide resources that will match the expected grwoth in transport
- there will be a sligth reduction in car travel
- transport growth will not be managed by public transport alone
- there will be a reduction in traffic accidents
- more tunnels will provide better local air-quality
- the initiativ will reduce the growth in CO2 emissions , but not enough in order to match the CO2 reduction targets for the region
- tunnels will reduce traffic noice
- after 2025 traffic is still estimated to grow

1.10 Some recent reactions

The Norwegian Institute for Air Research (NILU), together with the consultancy CIVITAS, have made estimates for air quality in 2025. Due to development of the transport system, improved car technology and cleaner wood stoves, the number of persons exposed to air pollution is estimated to be reduced considerlably. The introduction of Oslopackage 3 provides an additional reduction.

TØI argued recently that politicians have failed in their priorities. The package will neither contribute to reach the goals of a reduction in traffic volume nor the emissions of CO2 According to TØI the package contains to much road investments, and too little finance for public transport.

1.11 The National assembly will vote on the initiativ in the autumn 2007.

The population was rather negative to the toll ring before it opened. Now two thirds are in favour if a substantial part of the generated income is spent on public transport!

According togoverment policy, the initiatives for toll rings have to come from regional political boards.The initiativ has been approved by the City of Oslo and the Akershus County Council, and a Parliament vote is expected in the autumn of 2007.

1.12 Conclusion

The Oslopackages are parts of a development and finance strategy for the Oslo/Akershus region. The packages have contributed to less queing and have sharpened the competitiveness of the region. The new proposal for the third generation do also have ambitions for a sustainablit development.

The packages are results of regional political negotiations. There are opponents. Some would like to have a more environmental profil, others mitgh have prioritised road development even stronger and still others argue forstate finance. Oslopackage 3 is a political compromise for the development of the transport system in the Oslo region for the next 20 years.

Attachment

Workshop 1:
Authority, Responsibility and Justice in Environmental Politics

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Many of today's most pressing environmental problems share one important characteristic: they are cross-boundary, i.e., they disregard political and geographical borders. Obviously, this is challenging for several reasons. One is that present legal and political institutions have no effective reach beyond the nation-state. The same is the case with most political authority. Furthermore, the border crossing character of many environmental problems is also ethically challenging. What is a fair distribution of the burdens required to mitigate and adapt to e.g., climate change, chemical pollution and over use of marine resources and/or to make society less vulnerable to its' consequences? And perhaps even more difficult: Who has the responsibility to take action - those causing the problems or those in risk to suffer from the devastating effects? The papers in this section are discussing environmental problems from such points of view as authority, responsibility and distributive justice.

Workshop 2:
Urban Sustainability

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Workshop 3:
Sustainable Mobility

- Societal Trends and Planning Challenges

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Sustainable development is a concept few would disagree with at a general level, but is contested when put into actual practice. How is sustainable urban development discussed, defended and even coopted by actors in urban development? What is the actual urban development compared with the ideal? How useful are models and ideals in environmental policy-making? Urban governance in the Nordic countries has been marked by deregulation, privatisation and market solution. At the same time ecosystem management and the need for cross-sectoral and cross-boundary institutions have been underlined. What are the challenges, constraints and opportunities following from these trends in urban regions? New technology and urbanisation (both in terms of land-use and life-style) represent transport changing drivers with possibly environmentally friendly consequences. A new societal and political preoccupation with climate, energy and health issues might promote a more sustainable mobility pattern. However, the 'sustainable mobility' conceptualisation demands integrative policy measures and analytical planning tools to grasp – and communicate - the relationships and reduce the sustainable mobility complexity - across its causes, changes and consequences. The papers discuss the challenges, constraints and opportunities following from trends in urban regions and various societal (economic, political, social and cultural) drivers as important "policy and planning" challenges for a more sustainable mobility.

Workshop 4:
Internationalisation of the Environment:

The local perspective

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“Think globally, act locally” is a slogan from the Brundtland-report twenty years ago. Since then several Nordic as well as other European cities and local communities have responded to this call for local action. Local Agenda 21 highlighted local responsibility for sustainable development through decentralisation and participation. Meanwhile, the internationalisation of environmental policies has resulted in international agreements and regimes influencing and constraining local policies and action on specific topics. International expectations and demands (EU-directives as one example) might constrain the autonomy of local governments in developing a local policy for sustainable development, but they can also represent opportunities for local action. The papers discuss how local and regional governments face these challenges to local governance of combining the demands from above with the expectations from below.

Workshop 5:
Environmental Governance and Policy Implementation

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Throughout the Nordic countries both the debate about, and the practice, of institutional arrangements and processes can be characterised by decentralisation, deregulation, privatisation and marked. Consequently the relationship between public authorities and private actors (business, NGOs etc) are being reshaped: Processes of *government* have been seen as transformed into *governance* which mean that a wider range of actors may be participating and simplistic hierarchical models are being abandoned. The papers address how these changes effect the implementation of environmental policy: Which actors are involved? Whose interests are served? Whose knowledge is included and whose is excluded? Why do particular perspectives on environmental change become so entrenched in policy?

Workshop 6
The Legitimacy and Effectiveness of Global Environmental

Governance

Convenors:
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Kristin Rosendal, Global Environment Programme, the Fridtjof Nansen Institute, kristin.rosendal@fni.no

Debates about sustainable development are increasingly dominated by questions of how to secure values such as participation, representation, accountability and legitimacy in global environmental governance. The participation of non-state actors, such as business and civil society, is regarded as critical for the effective implementation of sustainable development policies in the EU, UN and various multi-level governance arrangements. The transformation of political authority through the emergence of new forms of post-sovereign power (such as private governance and public-private partnerships), makes an assessment of the effectiveness and accountability of these networked governance structures important. How can democratic legitimacy, participation and accountability be secured without compromising effective environmental governance and well-functioning policies? The workshop includes papers on the creation of more effective and legitimate multi-governance arrangements in various policy domains.