NATIONAL SUSTAINABLE TRANSPORT PLANNING – WHAT IS IT AND WHAT SHOULD IT BE?

Claus Hedegaard Sørensen, DTU Transport, Denmark, chs@transport.dtu.dk.

Henrik Gudmundsson, DTU Transport, Denmark, hgu@transport.dtu.dk.

Steen Leleur, DTU Transport, Denmark, sl@transport.dtu.dk

ABSTRACT

Sustainable transport has become a current and important ambition for transport planners and policy-makers around the world. In Denmark, this is confirmed in a political agreement on a 'Green Transport Policy', where significant new policies have been announced. However, a transition to sustainable transport raises important questions concerning the organization of national, planning processes integrating sustainability.

Internationally, transdisciplinary research on national, sustainable transport planning is limited and it is not established as a coherent field of research. The ambition of this paper is to establish understandings and definitions of national sustainable transport planning. This is done by first looking into the notion of 'national transport planning'; after that attempts and consequences of incorporating sustainability into the plans; challenges in current national sustainable transport planning; as well as a more ideal concept of national sustainable transport planning. This is all finalized by considering the implications for research in the field.

Selected literature on national sustainable transport planning and associated terms form the basis of the paper, and since, neighboring Sweden and Norway have for a number of years produced major, national transport plans, experiences from these two countries will work as examples throughout the paper.

Keywords: National transport planning, sustainable mobility, planning problems,

1. INTRODUCTION

Sustainable transport has become a current and important ambition for transport planners and policy-makers around the world. In Denmark, the government and Parliament have reconfirmed this ambition in an infrastructure plan on “Sustainable Transport” (Danish Government, 2008) and a political agreement on a “Green Transport Policy” (Ministry of Transport, 2009), where significant new policies have been announced. The European Commission also promoted this agenda in the Transport White Paper (European Commission, 2011).

As recent research suggest, a successful transition to sustainable transport raises important questions concerning how to organize strategic planning processes and how to apply knowledge tools in order to support the implementation of new policy goals and instruments for sustainability (Givoni & Banister, 2010). In Denmark, national transport planning procedures have been up for examination recently. The effectiveness of the previous “ad hoc” approach was indeed questioned by e.g. the Danish Infrastructure Commission (2008), and some planning innovations have now been adopted such as longer time frames, fixed planning cadences and coherent, strategic analyses. These innovations emerge in a national context characterized by traditions for strong involvement of Danish politicians in infrastructure decision making and implementation (Cars et al., 2009), but also in a sector characterized by significant public management reforms that have included the disintegration of former public monopolies and the marketization of transport services (Hodge et al., 2010). This raises further questions on how the changing institutional frameworks in the transport sector influence the way new planning processes and tools for sustainability can connect to the existing national decision making context (Toleman & Rose, 2009), and how this again will influence actual sustainability performance of transport systems and policies.

Internationally, transdisciplinary research on national, sustainable transport planning is limited (though OECD & ECMT, 2004; Short & Kopp, 2005; Transport Research Centre, 2000; Zografos et al., 2004), and it is not established as a coherent field of research. Transport planning frameworks are found to vary across countries, but there is no widely recognized way to typologize such frameworks to help explain their significance for national, sustainable transport planning outcomes. The research area needs to be advanced through a combination of theory, empirical study and methodological experimentation.

This is the background for a Danish research project, SUSTAIN, running from 2012 to 2016.The scientific objective of SUSTAIN is to help establish national sustainable transport planning as a coherent research topic across the social and technical sciences, while the societal objective is to promote future-oriented planning for a sustainable transport system.

This paper is a product of preliminary research within SUSTAIN. The aim of the paper is to discuss how we could conceive the concept of national sustainable transport planning; how can national sustainable transport planning be defined; what is actually taking place within this heading and what national sustainable transport planning possibly could be? The methodology applied is review of literature which mainly covers only some of the elements in

the concept. In this paper, the empirical research into actual national transport planning is limited but will be extended in subsequent steps of SUSTAIN. However, two examples of transport planning in neighboring Norway and Sweden is included throughout the paper, since these two countries for a number of years have produced major, national transport plans. Some core characteristics of the two Nordic, national transport plans are the following (Sørensen & Gudmundsson, 2010):

	Sweden	**Norway**
Planning horizon	The principle- and framework plan (inriktningsplanen) as well as the action plan (åtgärdsplanen) cover 2010 – 2021 (12 years).	The National transportplan and the agencies' individual action programs cover 2010 – 2019 (10 years).
Cadence	Every four or six years new plans are adopted.	Every four years a new national transportplan is adopted.
Stages	Principle- and framework plan as well as an action plan.	National transport plan as well as action programmes.
Cross modality	Both plans are integrating all transport modes.	The national transport plan is integrating all transport modes. Each action program covers one mode.
Width in measures	Planning mainly includes transport infrastructure, but also alternative models of funding.	Planning mainly includes transport infrastructure, but also economic measures, access to public transport for physically handicapped and surveillance.
Institutional connection	Ministry of Enterprise, Energy and Communications.	Ministry of Transport and Ministry of Fisheries and Costal Affairs.
Policy objectives	One superior objective and two sub objectives, a functionality objective and an integration objective.	One superior objective, four main objectives and stage objectives.
Indicators	Ex ante indicators are included in the plans. Ex post indicators are also	Indicators are attached to stage goals for the plan period. Are applied ex ante

	applied and new are being developed.	as well as ex post.

Table 1. Core characteristics of Swedish and Norwegian national transport planning. Point of departure is the Swedish plans 2010-2021 (Banverket et al., 2009) and the Norwegian 2010-2019 (Samferdselsdepartementet, (2009). Plans for the period from 2014 are currently being prepared, and the next Swedish principle- and framework plan is already published (Näringsdepartementet, 2012).

Thus, after this introduction the paper proceeds with a section 2 dealing with defining the term 'national transport planning' and description of characteristics of the Swedish and Norwegian plans . Section 3 enters into analyzing the integration of sustainability into national transport planning, while section 4 is devoted to four challenges in national sustainable transport planning efforts. Taking these challenges into consideration, we debate in section 5 what a more ideal national sustainable transport planning could look like. In section 6 we focus on the implications for research in the field of national sustainable transport planning.

2. NATIONAL TRANSPORT PLANNING

What is planning? Multiple and different definitions exist (e.g. Alexander, 1986: 39-43), but it is probably safe to suggest that planning is a deliberate activity that has to do with the future (Alexander, 1986: 43; Friedman, 1987: 37; Leleur, 2008a). It further often is expected to include the use of science and knowledge (Friedman, 1987: 38) and usually– as in this case – it is a social or super-individual phenomenon (Alexander, 1986: 42). Planning is often associated with rational decision-making following a number of subsequent steps from formulation of goals and objectives, identification of alternatives, evaluation of their consequences, and subsequent decision (Leleur, 2008b). Some authors also state that planning cannot be a routinized phenomenon because it deals with novel problems and the ambition might even be transformational (Alexander, 1986: 42; Friedman, 1987: 38-39). Thus, some characteristics of planning is likely to be deliberate, future-oriented, knowledge-based, super-individual, rationalistic and non-routinized. The last three decades of new public management reforms (Hood, 1991) with management by objectives and performance management as important philosophies or techniques (Christensen & Lægreid, 2002: 156) are likely to add objectives and evaluation of performance to these characteristics (Sørensen & Gudmundsson, 2010).

What is transport? Transport is the term of movement of freight and passengers from one location to another, while traffic is the physical expression of transport, thus, the actual movement of means of transport (Sørensen, 2001: 22-23). Usually transport and traffic is not considered as a goal per se, while rather mobility or accessibility is defined as goals. Mobility sometimes is defined as the ability or capacity to move (e.g. Ciuffini, 1995), and accessibility as the ability to reach goods, services and activities (Litman, 2012). Transport planning can be single modal (e.g. a road plan) or cross modal covering two or more transport modes.

Transport planning obviously often is dealing with transport *infrastructure* planning (OECD & ECMT, 2005).

The concept of 'nation' usually is conceived as a large group of people with a common history, culture and language (Cambridge Dictionaries Online). However, in instances of large, federal states as e.g. the USA and Canada also individual states are involved in transport planning with size and features similar to other countries' national transport planning, e.g. Texas Strategic Transport Plan 2013-2017 (cf. Texas Department of Transportation, 2012). 'National' in our context can be understood as differing from the local (e.g. city, municipality) and regional (e.g. county), though – as we will see – the national focus might not imply that local and regional issues are ignored. Thus also large, individual projects, like a bridge connecting parts of the country or congestion charging in the capital can be conceived as national planning though the geographical scope is limited. The national focus can imply national transport planning being all-embracing and time-consuming, and it usually will involve a huge amount of civil servants involved in the planning efforts. (Sørensen & Gudmundsson, 2010).

Both Sweden and Norway for a number of years have conducted what they themselves term a 'national transport plan' – and several generations of plans now have been accomplished in both countries. The last generation of Swedish (Banverket et al., 2009) and Norwegian (Samferdselsdepartementet, 2009) national transport plans has had a time frame of 10-12 years, but in both cases they are expected to be substituted by new plans after four years. To a very large extent the plans are transport *infrastructure* plans, and only to a minor extent other issues are included. Both plans cover the entire country – and it seems to be an ambition that all parts of the country are analyzed and benefit from investments. The national transport plans in both cases include goals though in the Swedish case the political debate about the transport goals took place in and around another policy document (Näringsdepartementet, 2009). Ex ante indicators are included in the plans or in connection to the plans to indicate impacts of suggested measures and investments. In both countries national plans previously were made for each mode separately, but now are including all modes. In both countries incentives to make local authorities contribute to fulfill national transport goals are established, in particular in Norway by way of the so-called reward scheme (belønningsordning) (Norheim et al., 2007) And in the Norwegian framework previously also different alternative strategies (accessibility, traffic safety, environmental protection and regional development) have been included (Sager & Ravlum, 2005: 41). The political impact of the knowledge and calculations included in (connection to) the plans have been questioned (Sager & Ravlum, 2005; Sager & Sørensen, 2011, Sørensen & Gudmudsson, 2010).

To sum up, national transport planning can be defined in a minimalist way as deliberate and future oriented endeavours of relevance for the nation and dealing with the movement of freight and passengers. The examples of national transport planning in Sweden and Norway show that this can take place via recurrent, comprehensive and knowledge-informed, cross modal planning processes and documents including goals, ex ante indicators, alternative strategies, investments and other measures.

3. ... INCLUDING SUSTAINABILITY

With the Brundland Report (Our Common Future) from United Nation's World Commission on Environment and Development in 1987 (World Commission, 1987) 'sustainability' became an established element in politicians' and planners' discourse. Efforts at European level also contributed to this, e.g. three generations of the European Commission's Transport White Papers and the ambition of environmental policy integrating in sector policies as e.g. transport (Sørensen, 2003). Denmark was one of the first countries in the world to publish a national transport plan addressing the issue of sustainability, thus the transport action plan for environment and development published in 1990 (Sørensen, 2001; Trafikministeriet, 1990).

In the Brundtland Report sustainability was defined as a "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission, 1987). Today, it is common to understand sustainability as encompassing three (or four) dimensions or pillars, hence an environmental, an economic and a social dimension and sometimes also an institutional dimension (Gudmundsson, 2004; Meunier, 2012)

Today, hardly any political plan can avoid referring to sustainability, and in fact these ambitions have arisen simultaneously with endeavours to conduct national transport planning. When approaching the Swedish and Norwegian examples, how is sustainability integrated in the national transport plans?

Sustainability is included in the transport policy objectives that aim to guide planning. Thus, in Sweden the overall objective of transport policy is to "ensure socially and economically efficient and long-term sustainable transport resources for the public and industry throughout Sweden" (Gudmundsson & Sørensen, 2011: 20; Banverket et al., 2009). In the last Norwegian national transport plan the overall transport policy objective was "to offer en efficient, accessible, safe and environmentally friendly transport system that covers societal needs for transport and advance regional development" (Samferdselsdepartementet, 2009: 47 – our translation). Beneath these overall objectives the Swedish plan operates with two sub-objectives, a functionality objective focusing on accessibility and an integration objective focusing on safety, environment and health (Banverket et al., 2009, attachment 1, p. 5). The Norwegian plan beneath the overall objective operates with four main objectives on mobility, safety, environmental protection and accessibility for disabled people (Samferdselsdepartementet, 2009: 47-48). So although only mentioned explicitly in the Swedish overall transport policy objective, one could see sustainability considerations also to be incorporated in the Norwegian political objectives. Ex ante indicators of the national plans' consequences for environment and other issues are included. In the Swedish plan anticipated effects on climate and noise are calculated (Banverket et al., 2009: 210-214), while in the Norwegian plan the effects are indicated by considering whether the effect is

positive or negative (Samferdselsdepartementet, 2009: 53). Depending on the definition of the social dimension or pillar of sustainability, indicators and assessment analysis of this dimension might be lacking, as also stressed as a more general problem by Meunier (2012).

If focusing on the environmental dimension or pillar, one can distinguish between different approaches to transport policy and planning, thus, technological changes in vehicle design and fuel standards (electric, hydrogen and hybrid technologies), increased capacity utilization (improved utilization of vehicles and infrastructure); modal shift (to public transport, cycling, walking, and freight transport by sea) and reducing of transport demand through land use planning and economic incentives. This distinction has been addressed by more authors (Banister, 2008; EEA, 2010). The European Environmental Agency has applied the terms 'avoid', 'shift' and 'improve' as labels of the different approaches.

The focus on transport infrastructure in the Swedish and Norwegian plans implies that technological development, increased capacity utilization and reduction of transport demand is hardly affected by the plans. However, the plans include an ambition to impact on modal shift by prioritizing public transport and move freight from trucks to ships, and environmental concerns lie behind this ambition (Sager & Sørensen, 2011; Sørensen & Gudmundsson, 2010).

In particular the Norwegian national transport plan also aims to guide the local authorities. Hence, a chapter in the plan is devoted to transport policy in urban areas. Of particular interest in Norway is a so-called reward-scheme for improved public transport and reduced use of private car in urban areas. The scheme include state funding to local authorities that can show improvements as regard the goals of the scheme (Samferdselsdepartementet, 2009; Urbanet Analyse, 2012).

Following up on the above minimalist definition of national transport planning, 'national *sustainable* transport planning' could be defined as deliberate and future oriented endeavours of national relevance to integrate environmental, social and economic sustainability in the movement of freight and passengers. In the examples of Sweden and Norway these endeavours mainly take place through formulation of political objectives and by choice between infrastructure investments.

4. CHALLENGES IN CURRENT PLANNING EFFORTS

Above we have explained features in national, sustainable transport planning and briefly analysed the Swedish and Norwegian examples. Literature suggests a number of problems and challenges in such transport planning – some are more thoroughly substantiated than others, and the list below is not complete.

First, though ambitions of integrated planning across transport modes most national transport planning is still often taking place separately within each mode (Sørensen & Gudmundsson, 2009). In Norway, the fourth cross-modal national transport plan is now under way (in

Sweden the second), and thus, experiences with transport plans integrating all modes are extensive, and improvements seem to have been achieved, though the plans also recently have been criticised for insufficient integration (Sager & Sørensen, 2011). Difficulties in achieving cross modality might in some cases be reproduced through a organisational structure and culture backing sub-sectorizing (Sørensen, 2003).

Second, infrastructure is the focus of national transport planning. However, academic literature as well as policy ambitions often stress that this focus should be broadened to also cover measures and incentives to change transport behaviour. Hence, e.g. the European Environmental Agency in their analyses of CO_2-abatement policy have outlined the need of combining three different approaches – 'avoid', 'shift' and 'improve' each including specific policy measures (EEA, 2010: 23). Banister simultaneously has talked about actions to reduce the need to travel, to encourage modal shift, reduce trip length and finally to encourage greater efficiency in the transport system (Banister, 2008). A traditional transport planning focus on infrastructure might address modal shift by focusing on infrastructure provision in e.g.public transport – which seem also to be the case in both Sweden and Norway (Sager & Sørensen, 2011; Sørensen & Gudmundsson, 2009), but the 'shift' approach and other approaches cannot be advanced only by providing infrastructure. Also economic instruments, information instruments, regulatory instruments and technological instruments are needed.

Third, policy objectives are often included in national transport plans, e.g. in the Swedish and Norwegian plans. Also in the Danish infrastructure plan and political agreement from 2008/09 political objectives (or principles) were included (Danish Government, 2008; Ministry of Transport, 2009). However, the influence in actual transport planning of these objectives – their potential as a steering mechanism - seems to be limited. Hence, Sager & Sørensen conclude from interviews with Norwegian transport MPs that 'the politicians are unable to manage by objectives and results' (2011: 225), a conclusion which also seems to be more generally valid (Christensen & Lægreid, 2001). In Swedish transport planning other objectives than the formal transport policy objectives are included in decision making, and management by objectives and results in transport planning is probably more applied as a steering *philosophy* than a *steering technique* with clear, stable and operational objectives, performance measurement and follow-up (Sørensen & Gudmundsson, 2010).

Fourth, as stated above one way of integrating sustainability in national transport planning has been to include it in overall policy objectives in the field as well as in subordinate objectives. The above illustrated apparent reluctance to apply these objectives as part of a steering regime guiding policy formation and implementation of the plans might have particularly serious consequences for the sustainability dimension. Hence, necessity to change behaviour is difficult with the overriding focus on infrastructure (Sørensen & Gudmundsson, 2010) and organisational obstacles have also been brought up as an important feature (EEA, 2005; Sørensen, 2003). Also more traditional failures of implementation of public policy might be at stake (Hill & Hupe, 2002; TransportMistra, 2009). Thus, the Swedish and Norwegian cases are examples where policy and planning efforts for

various reasons so far have not succeeded in obtaining the climate objectives, and possibly to some extent the political objectives are decoupled from the planning activities.

5. WHAT NATIONAL SUSTAINABLE TRANSPORT PLANNING COULD BE

The societal objective of the Danish research project, SUSTAIN, is to promote future-oriented planning for a sustainable transport system. This ambition presupposes that this is advantageous compared to the traditional 'ad hoc' approach in Denmark. A thorough comparison between different approaches and their benefits so far has not been made, but it is obvious that an approach in accordance with national sustainable transport planning needs to manage – to some extent – the challenges in current planning efforts explained above.

National sustainable transport planning should strive to establish planning that covers and integrates all modes: road, rail, air and sea transport and even all modes applied within road transport (Banister, 2008). Tools applied in the planning process should make it possible to compare and make *strategic* choices among different modes.

It further should aim for a multiplicity of measures like economic measures, spatial planning, information, regulation and technological development and demonstration in order to change behavior and promote all three approaches: 'avoid', 'shift' and 'improve'.

When it comes to application of transport policy objectives in transport planning it is important to find a proper role for these objectives: Is it possible to establish sufficiently clear political objectives, matching indicators and an institutional set-up that allow for some degree of management by objectives and result as a steering technique, or is this ambition not realistic (Sørensen & Gudmundsson, 2010)?

Decoupling of sustainability considerations and implementation barriers should be considered seriously to find ways of reducing these obstacles through political commitment, institutional reforms and through changes in administrative culture and practices.

Cross-disciplinary sustainability research (Becker et al., 1997) recognizes that transition towards sustainability is a process that must involve three dimensions: a normative dimension (value orientations), an analytic dimension (objective conditions for sustainability vs. non-sustainability), and a strategic dimension (actor strategies and organisational change). Other researchers in similar and related fields have suggested dimensions alike (Hisschemöller & Hoppe, 2001; Turnhout et al., 2007; Voss et al., 2007). National sustainable transport planning should address all three dimensions, and be aware of the important interlinkages between the dimensions as suggested in the figure below.

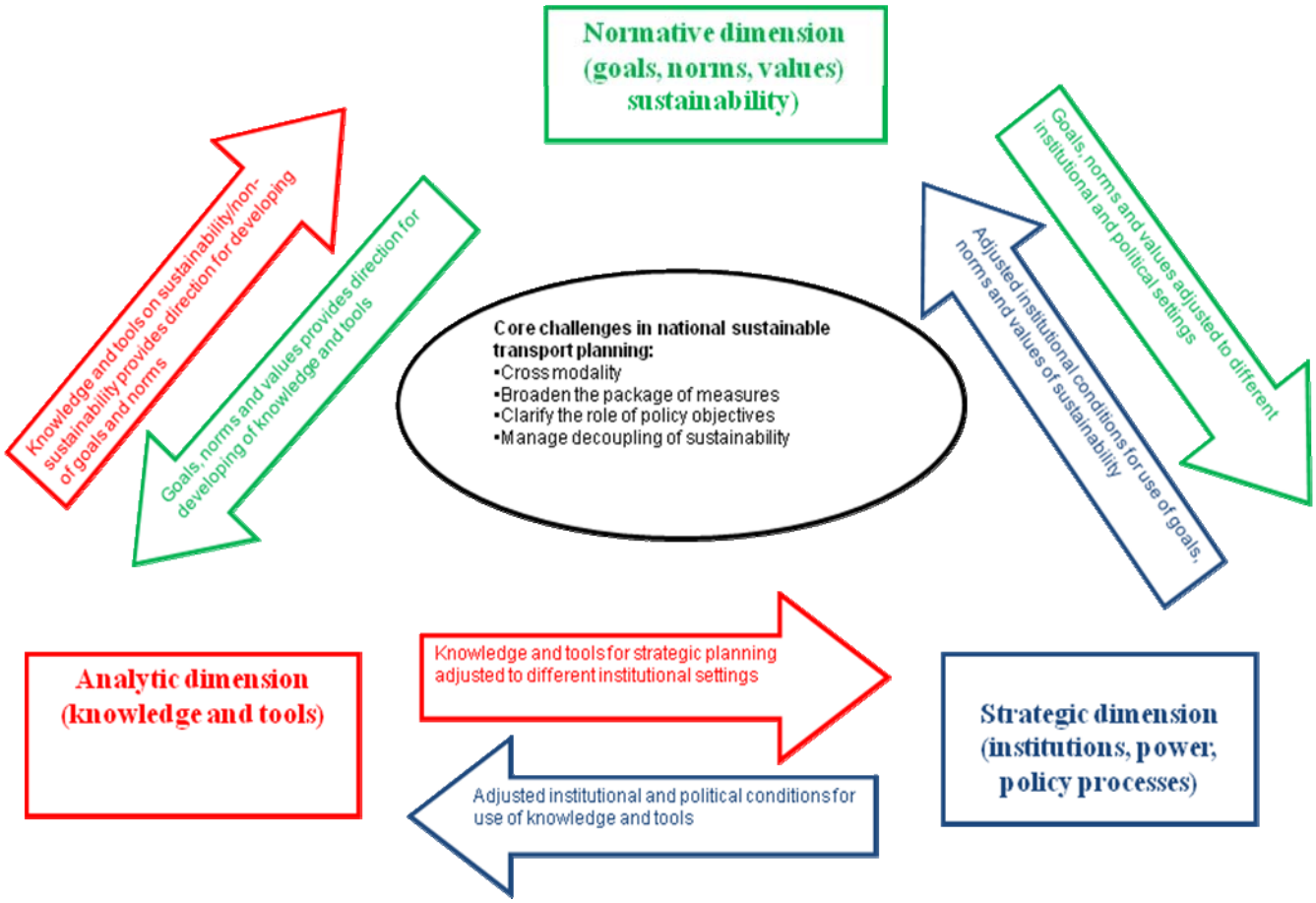

Figure 1. Three dimensions of national sustainable transport planning

6. IMPLICATIONS FOR RESEARCH IN THE FIELD

National, sustainable transport planning is not established as a recognized and coherent field of research. However, the ambition of the Danish funded research project, SUSTAIN, is to advance this research field with theoretical development, empirical research and methodological experimentation.

A focus of research in the field would be to describe, analyse and learn from existing planning endeavours of national (sustainable) transport planning, and on this background provide prescriptions for improvements, which is also the setup of the Danish SUSTAIN project.

To advance in research on national sustainable transport planning it is important to acknowledge a diversity of important elements. Within the SUSTAIN project the three dimensions of cross-disciplinary sustainability research have been translated into ‘sustainability’, ‘institutions’ and ‘tools’ (see table 2 below).

Becker et al. (1997)	Normative dimension	Analytic dimension	Strategic dimension
Voss et al. (2007)	(Ambivalent) goals	(Uncertain) knowledge	(Distributed) power
Hisschemöller et al. (2001), Turnhout et al. (2007)	Goals/norms/values	Use of knowledge	Policy process
SUSTAIN	Sustainability (indicators and performance measurement)	Tools (flexible tools for planning and evaluation)	Institutions (new organisational forms and transport planning processes)

Table 2. Dimension in research on national sustainable transport planning

Each dimension embraces a number of important topics for research in national sustainable transport planning, and in this paper challenges are highlighted which can only be addressed adequately by applying perspectives from more dimensions. Hence, the challenge of cross modal planning point to knowledge and tools that contribute to strategically choices across transport modes, however obviously also power and institutional set-ups can contribute to or hinder cross modality in transport plans, and also appropriate political goals and definitions of sustainability are of importance. Similarly, the challenge to broaden the scope of transport planning to also cover measures and incentives to change transport behaviour, which not least presuppose an institutional set-up that improves for corporation among different ministries and agencies and probably jurisdictional levels, but also address the normative and analytic dimensions. The formulation of political objectives in national transport plans belongs to the normative dimension, while the ex ante and ex post provision of knowledge on achievement of goals and the conditions for use is reasonably analysed within the other two dimensions. Also the overall challenge of integrating sustainability in other planning activities can be addressed from all three perspectives.

Core research interlinkages among the SUSTAIN-dimensions are illustrated in the figure below

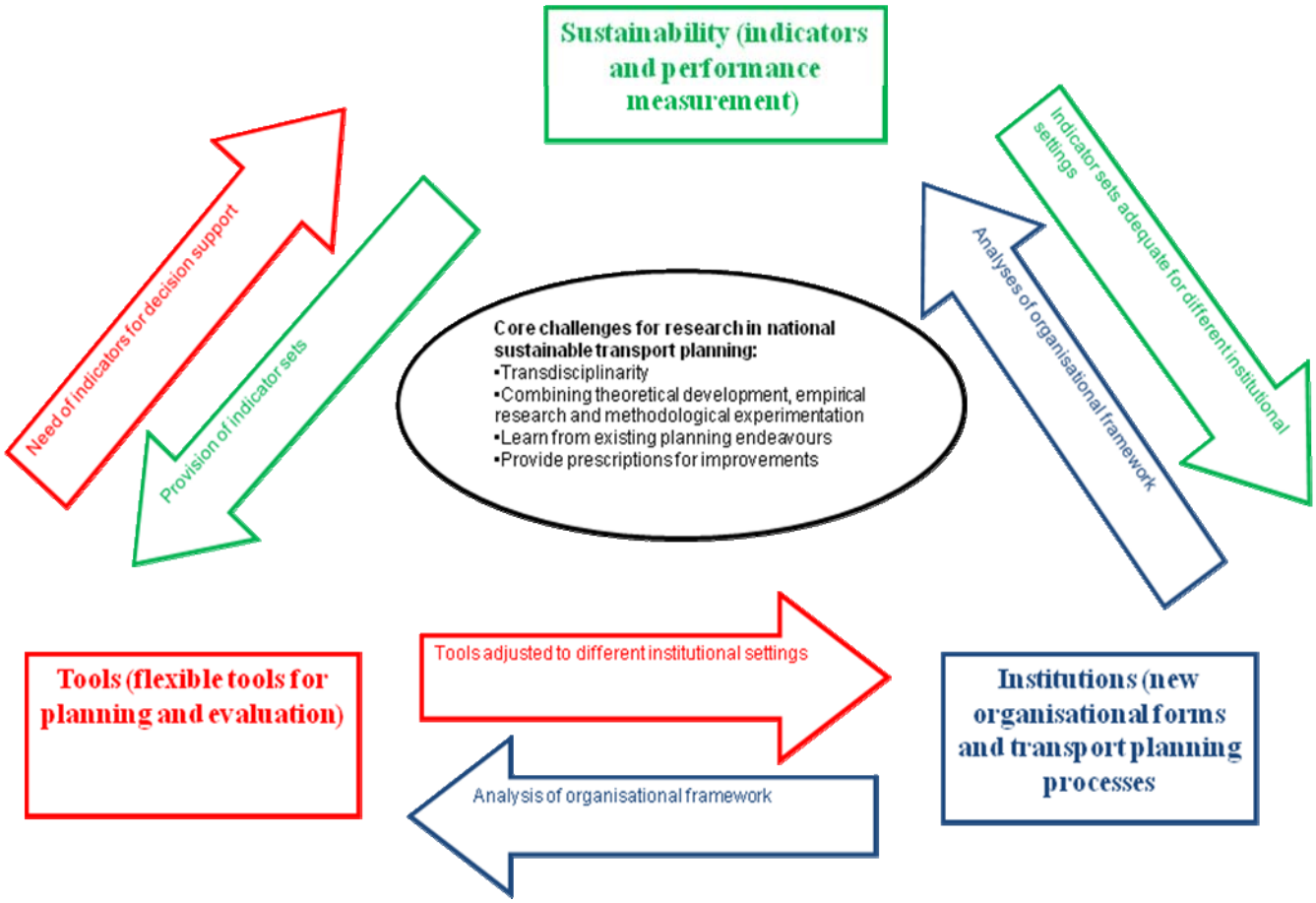

Figure 2. Three dimensions of research in national sustainable transport planning

Analyses within and across these dimensions are not straight forward, since we are dealing with ambivalent goals, uncertain knowledge and distributed power, as stated by Voss et al. (2007).

Research in national sustainable transport planning could benefit drawing on and recognizing these three dimensions and their interlinkage, though, specific research projects within the overall topic, might focus on only one or two of these dimensions.

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