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Transport planning



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Transport planning has evolved from a type of specialist sectoral planning into a form of more comprehensive spatial planning with a significant impact which must achieve certain aims (integrated transport development planning). Besides securing and improving mobility and transport, it seeks to achieve more sustainable transport with fewer adverse effects and lower resource consumption. This article sets out the methods, requirements and positioning of transport planning.

1 Preliminary remarks

Transport planning has evolved from a type of specialist sectoral planning, in the sense of demand-oriented adaptive planning around the design and dimensioning of transport infrastructure and services, to a more complex form of integrated transport planning. However, there is often a disparity between practical action around transport planning on the one hand and theoretical aspirations on the other, as traditional sectoral perspectives in the line organisations of administrative bodies and the preferences of policy-makers more often than not lead to one-sided results from a technical and/or political point of view.

Integrated transport planning, as it is taught today, no longer entails hard infrastructural measures and their design and dimensioning, but increasingly calls for ‘demand management’, i.e. shaping transport through spatial planning, pricing and regulatory measures, as well as soft measures of mobility management (cf. Ahrens/Hubrich 2012). Therefore, we no longer talk about general transport plans, but rather about integrated transport development plans or mobility (master) plans / Sustainable Urban Mobility Plans (SUMP). This applies to both federal and state transport infrastructure planning (▷ *Federal Transport Infrastructure Planning*) and in particular to regional and local transport strategies. These are organised and implemented by way of informal planning which takes into account the respective local characteristics (▷ *Informal planning*) and serves as a preparation for and facilitation of formal ▷ *Spatial impact assessment procedures (Raumordnungsverfahren)*, ▷ *Planning approval* and ▷ *Urban land-use planning* as requirements under planning law for implementing ▷ *Transport infrastructure*. The local transport development plan is the sectoral transport plan which sets out the main road transport networks for the ▷ *Preparatory land-use plan*. It is thus in practice a statutory duty of the local authorities (cf. Road and Transportation Research Association [*Forschungsgesellschaft für Straßen- und Verkehrswesen, FGSV*] 2013: 5).

The specialist units responsible for transport planning are conventionally part of the local planning authority, however they are increasingly found in transport bodies too, where tasks carried out by the authorities for planning, construction, operations and traffic are bundled. Depending on the size and form of the organisations, there may be working interfaces between ▷ *Urban design* and transport, planning and construction, and/or transport planning and road traffic authorities. Given the impact of ▷ *Mobility* and transport, integration into ▷ *Spatial planning* and close cooperation with the authorities responsible for environmental protection, the economy, social affairs, schools, sports facilities, etc. is required. Most types of new planning, such as ▷ *Air pollution control and noise abatement planning* include transport planning measures.

Transport planning is thus understood as an interactive process between committees with decision-making authority, specialist authorities and interest groups. The ‘Guidelines for transport planning’ (cf. FGSV 2001) contain a detailed description of this process for all types of transport planning at various levels; a new version has been under preparation since 2014.

The guidelines were fleshed out specifically with regard to local and regional transport development plans in the ‘Information on Transport Development Planning’ (FGSV 2013) and the ‘Information on Participation and Cooperation in Transport Planning’ (FGSV 2012). In addition to the informal transport development plans, new national and European laws have provided for formal plans for local public transport, air pollution control and noise abatement. This

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has resulted in increased requirements on the transport development plan as a coordination instrument and the strategic involvement of the many elements of formal and informal sectoral planning relevant to transport. These plans all require transport planning data and should contain identical/compatible objectives and measures.

For Europe, the European Commission recommends appropriate target-oriented transport development plans as Sustainable Urban Mobility Plans (SUMP) with the planning being clearly geared towards the objectives of sustainable mobility development. To this end, guidelines were drafted in 2011 and published again in 2014 with a new introduction (cf. Wefering/Rupprecht/Bührmann et al. 2014). They confirm the hierarchy of basic transport planning principles that have been taught for many years:

- 1) Traffic avoidance
- 2) Traffic relocation
- 3) Acceptable management of necessary traffic

Given the constitutional significance of the general competence of the local authorities and the resulting principle of ▷ *Subsidiarity* in Germany, national objectives (e.g. reduction in vehicle traffic) are not possible here for local transport planning in the same way as in other EU member states (e.g. France or Spain). From a technical point of view, however, it must be noted that transport is significantly shaped by spatial changes such as ▷ *Suburbanisation*, ▷ *Reurbanisation*, the separation of functions, land use and usage density. For this reason, traffic avoidance measures are particularly relevant here. In addition there are significant requirements relating to ▷ *Climate protection* and ▷ *Environmental planning*.

It is thus clear that transport planning must be considered and treated as an integral component of spatial planning. Objectives and specifications from other transport and spatially-relevant types of sectoral planning (relating to the economy, environment, culture, sports facilities, etc.) must be taken into account from the outset (▷ *Spatially-relevant sectoral planning*).

2 Definitions and basic principles

The purpose of all transport planning is the target-oriented, systematic, forward-looking and informed preparation of decisions about actions that affect transport (supply, demand, management and impact) in accordance with the stipulated objectives (cf. *FGSV* 2001: 6).

Mobility refers to the potential for social participation as well as the facilitation of activities and interactions at various locations regardless of the means of transport. Transport serves these ends and is the real sum of the movement of people, goods, energy, news or data.

Person-based activities at different places facilitated by transport include ▷ *Housing*, working, the supply of goods and services, education and leisure (also basic functions of existence; ▷ *Provision of public services*). Goods-based activities include, for example, the extraction of raw materials, production, processing, storage and consumption.

One key function of transport planning that is geared towards sustainability and efficiency criteria is securing mobility with minimal traffic. The objective is to decouple traffic growth, in particular vehicle traffic, from economic growth.

Transport planning considers the reasons for travel, the travel itself, the traffic flows as well as the positive and negative impact of traffic such as accessibility, travel times, demands on resources and negative effects, at all planning levels and for all modes of transport. Travel is prompted by both quantifiable temporal, spatial and social circumstances as well as subjective behavioural perceptions. Travel is therefore examined in terms of volume, mode of transport, management and impact and is often simulated using macroscopic or microscopic transport models.

3 Objectives and working methods

Transport planning is an ongoing iterative process, which must be addressed and updated constantly. The instruments and transport data used must be continuously or periodically monitored, and targets and goal attainment must be reviewed. The transport planning process is divided into the following phases: initial orientation, problem analysis, exploration of measures, weighing of interests and decision-making as well as implementation and impact control (see Fig. 1).

The transport planning process involves

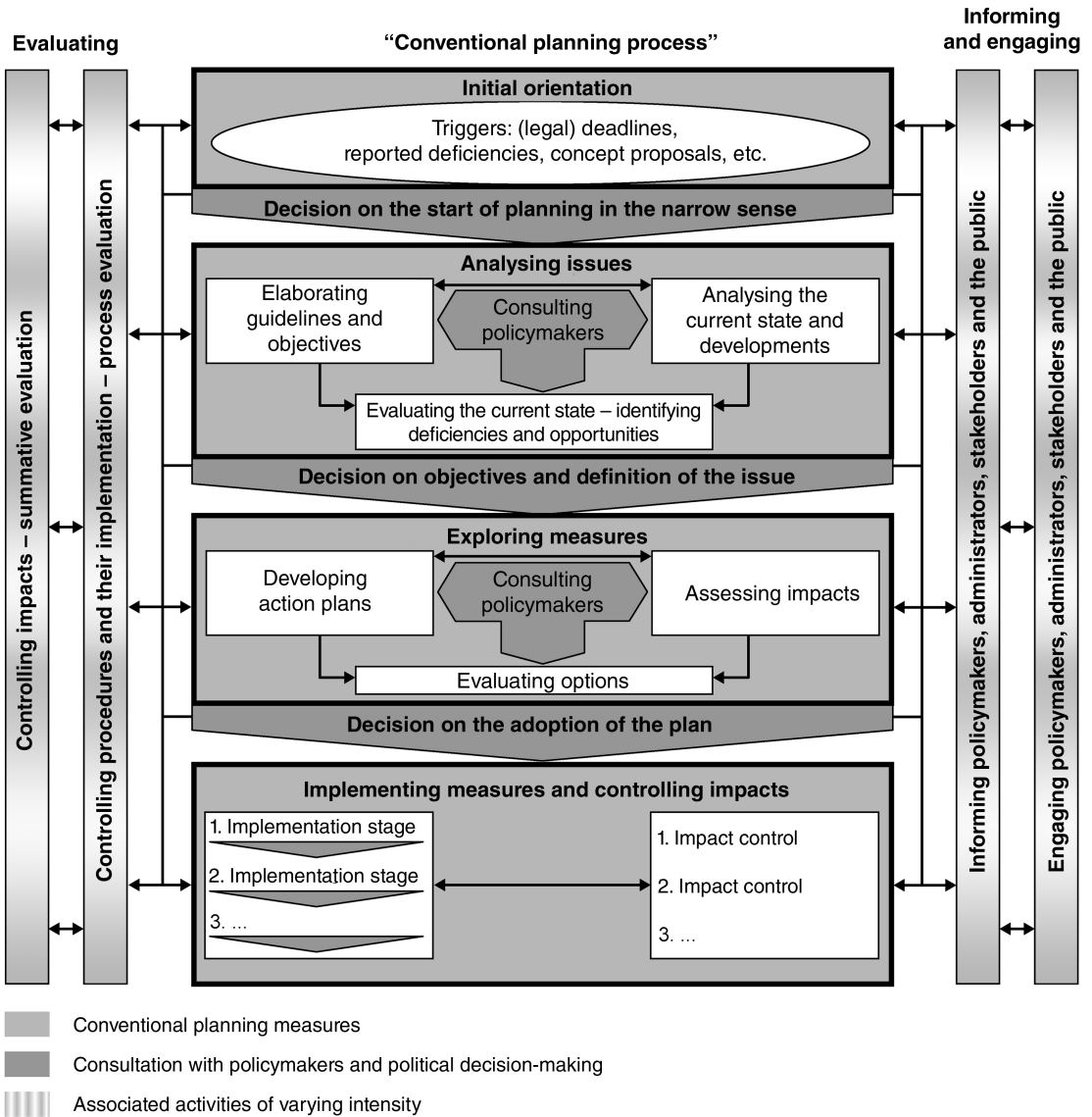
- describing, analysing and assessing circumstances,
- drafting and reviewing aims and the strategies to achieve them,
- drafting possible courses of action, action strategies and measures,
- assessing and predicting the impact of the possible courses of action,
- preparing decisions regarding possible courses of action,
- overseeing implementation,
- evaluating successes and impacts (cf. *FGSV* 2001: 8; *FGSV* 2013: 14 et seq.).

The transport planning process (see Fig. 1) includes normative planning activities, i.e. important processes of policy coordination and decision-making, and the classic informative preparatory planning activities of professional planners as well as the associated activities around information, cooperation and the participation of other stakeholders.

For reasons of pragmatism and efficiency, a distinction is made between two levels of responsibility in transport development planning:

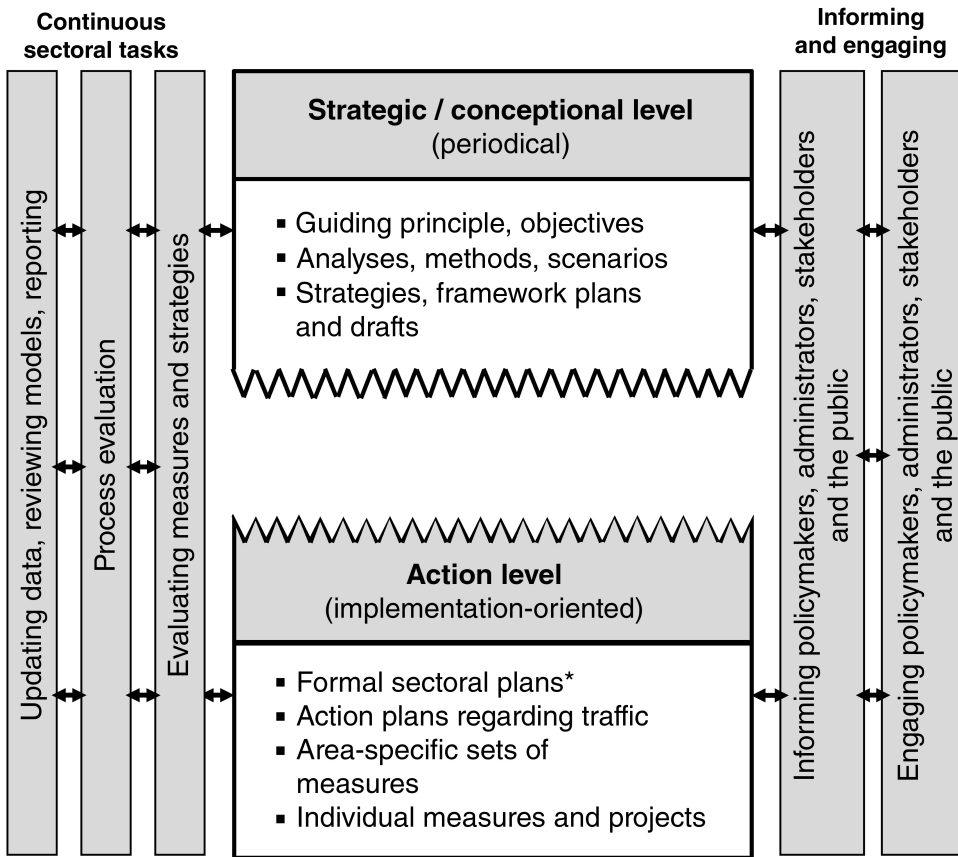
- the strategy-drafting level and
- the action level (see Fig. 2).

Figure 1: The transport planning process



Source: FGSV 2013: 15

Figure 2: Levels of transport development planning

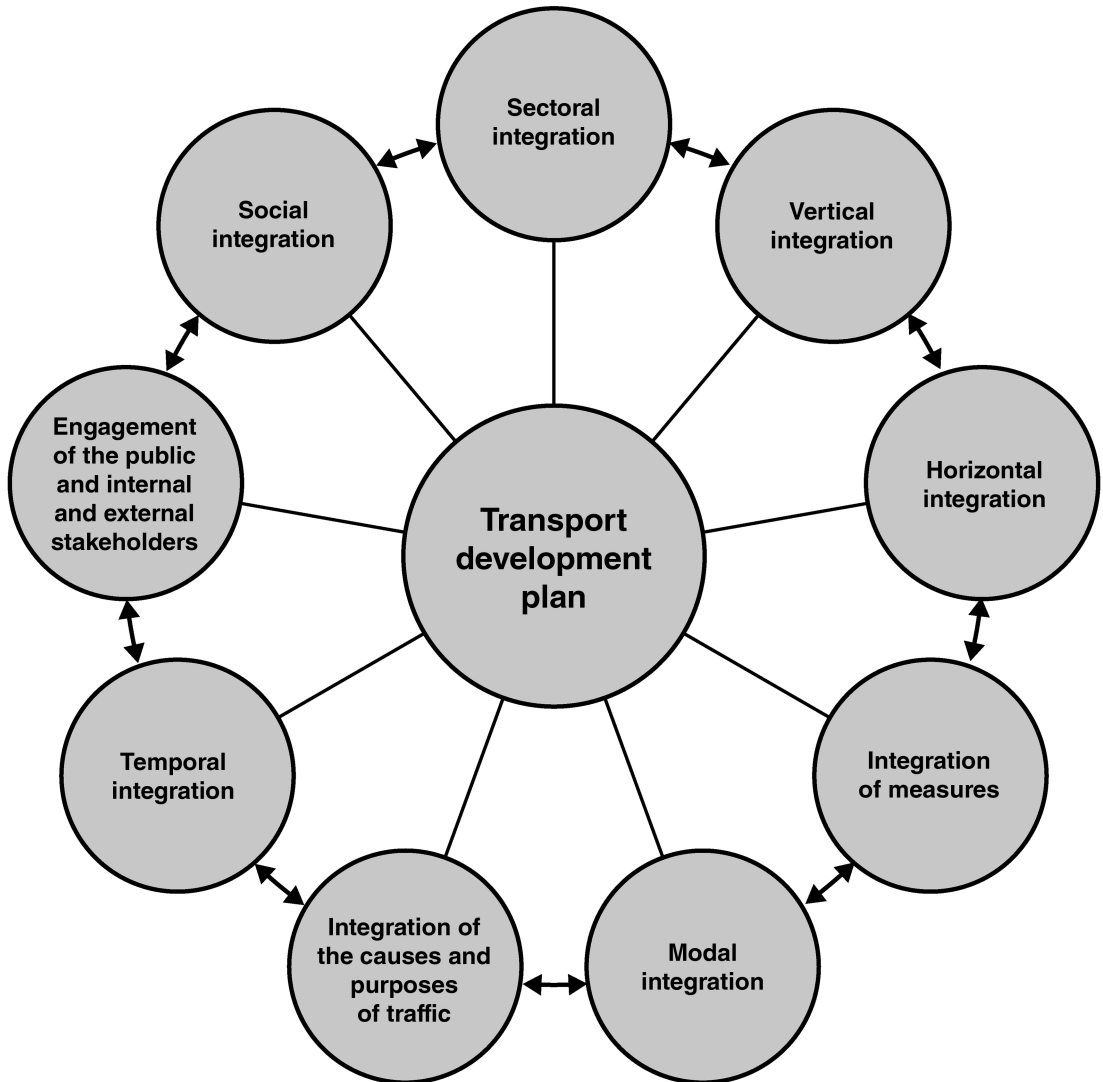


*for local public transport, air pollution control and noise abatement

Source: FGSV 2013: 22%

Transport planning must integrate numerous aspects (see Fig. 3): All sectoral planning relating to space and transport must be taken into account (sectoral integration), as must stipulations and requests from other planning levels (vertical integration; > *Mutual feedback principle*; subsidiarity), coordination with the adjacent planning areas (horizontal integration), networks of a comprehensive multimodal transport system (modal integration) across all means of transport, the integration of different reasons and purposes for travel, the temporal integration of continuous and periodic work processes, the integration/involvement of the public, internal and external stakeholders (cf. FGSV 2012) and questions around inclusion and social integration. Taking these integration aspects into account (cf. FGSV 2013: 11 et seq.) leads to a broad ‘integrated range of transport planning measures’ which includes measures relating to spatial planning, price, regulatory and information policy.

Figure 3: Integration aspects of transport development planning



Source: FGSV 2013: 11

Of particular importance here is the fact that overall traffic (passenger traffic and goods traffic) can only be managed collaboratively, i.e. the modes of transport (▷ *Private motor vehicle transport*, ▷ *Public transport*, non-motorised transport, intermodal transport) are to be analysed as interdependent and measures are to be developed across all modes of transport as part of the comprehensive multimodal transport system. For pragmatic reasons strategies and measures are often developed for individual modes of transport (▷ *Road traffic*, ▷ *Rail transport*, ▷ *Air traffic*, ▷ *Inland navigation* and ▷ *Maritime transport*), but in such a way that they are compatible with and complement each other and that, first and foremost, the transitions between the modes

of transport and the multimodal and intermodal mobility services are included in the planning (e.g. park-and-ride facilities, connecting points, combined tariffs, car-sharing, crossing options, mobility stations, etc.).

Transport planning processes place demands on the data and the transport models to be used for interdependency analyses of initial situations and potential scenarios. Transport planning collates the estimated requirements for evaluating the measures for formal planning processes (in particular urban land-use planning and planning approval) (▷ *Weighing of interests*). This involves weighing up the interdependencies of the different modes of transport as well as the impact of the future scenario compared to the initial situation and other conceivable options. It must be demonstrated that the selected option maximises all of the benefits and minimises the disadvantages relevant to the weighing. The degree of impact, benefits and adverse effects must be documented for the planning options under consideration (▷ *Environmental assessment*).

Transport models are developed, tested and calibrated with local data for the area under consideration as part of transport planning to provide this type of comparable basic information. The accuracy of the models greatly depends on the quality and currency of the input data. For this reason, the continuous, coordinated provision of data from transport figures, the relevant population and usage statistics and from regular local household and company surveys on journey behaviour is essential for transport planning. This data is required roughly every five to ten years in order to update strategic transport development planning, and constantly to ensure that the current formal planning law processes stand up in court.

4 Requirements of transport planning based on available knowledge

In addition to the aforementioned basic principles of transport planning, planning which is today oriented toward integrated and sustainability objectives is based on a changed, integrated understanding of the subject. More so than in the past, the question of the necessity of conventional transport infrastructure, in particular road construction, is at the forefront of the weighing of interests. The reasons and background for this include tight financial margins, political objectives, shrinking populations in many places, the difficulty in enforcing planning and the pursuit of other options by way of soft policies. Unnecessary expenditure on infrastructure should be avoided, and planning based on existing infrastructure increasingly champions preserving and maintaining the transport infrastructure.

In Germany and Europe one has the freedom to choose one's means of transport, although in practice there are certain constraints to this choice. The extensive shift of commuter traffic onto public transport as well as the temporal and spatial limits of private motor vehicle transport in cities (▷ *Urban traffic*) are now widely accepted. In this regard, walking and cycling are also becoming increasingly important. Almost all public transport laws of the federal states demand the development of the public transport system in urban agglomerations as a more efficient priority system. While the speed and ease of transport were priority considerations in the past, aspects such as reliability and safety take precedence today.

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It is important to clearly define the planning objectives on the basis of intense dialogue with stakeholders and decision-makers. A transport development plan is not just a technical blueprint, it is also essentially a guiding principle that needs to include political objectives (regeneration targets, demand management, transport spread, emission control, safety improvements, etc.).

The status quo analyses are problem-oriented and include both functional traffic data and all of the town planning and environmental data for the current situation. Besides traditional forecasting, potential future scenarios are increasingly drawn up and used to evaluate future developments depending on settlement structure and mobility requirements (▷ *Forecasting*; ▷ *Scenario*).

Assessing the current situation is an important prerequisite for examining the 'no action' option ('no action' forecast). All types of transport are taken into account in the environmental order of priority, or at least commensurately and over a wide area. The compatibility or incompatibility of usage requirements is an important basis for drafting and shifting strategies. As well as determining the demand for transport, transport models above all serve to assess the impact of various measures.

Such impacts are assessed holistically using indicators from areas such as spatial planning and transport, settlement area and urban design (including promoting economic strength), the balance of nature, landscape as well as economic efficiency. The statutory Environmental Impact Assessment (EIA) for formal processes is integrated in all planning levels via these areas and does not require a separate, dedicated process (▷ *Environmental assessment*).

Integrated strategies for action are developed from the urban planning strategy, other functional specifications and the strategies specific to modes of transport; these are not just limited to networks that can be realised in the long term, but also include demand/transport system management measures that are achievable in the short term (measures relating to regulatory, taxation and pricing policy as well as operational measures, consultation and coordination, measures for extensive traffic calming and the reconfiguration of street spaces).

Part of the integrated strategy for action is a nuanced implementation strategy, which should include implementation of the planning and drafting considerations as well as a priority ranking taking into account financing and subsidisation options.

A broad political census should be sought from the development stage. It is therefore recommended to gradually develop transport planning in constant dialogue with internal and external as well as parliamentary working groups associated with the project.

5 Outlook

Transport planning in Germany is highly methodical and procedural. When these processes are well-communicated and executed with a high level of professionalism, there is a much greater likelihood of steering socially contentious discussions about transport toward a consensual strategy and thus creating favourable conditions for measures to be rolled out without conflicts.

Transport planning is increasingly considered a communicative socio-technical process, which is not executed solely by expert planners on the basis of the primarily sectoral objectives of transport planning and transport technology. The growing inclusion of ‘soft measures’, primarily aimed at journey behaviour, highlights the paradigm shift described here. However, there is still a need for further research into the combined effects of the gamut of measures.

The Road and Transport Research Association (*Forschungsgesellschaft für Straßen- und Verkehrswesen, FGSV*) offers the following summary of the key aspects of contemporary transport development planning (FGSV 2013: 43 et seq.):

- Interdisciplinary, broad participation and cooperation
- Oriented toward objectives and scenario planning
- Comprised of a strategy-development level and an action level
- Transport development planning is seen as a continuous process
- Evaluations and audits of results are part of the process
- Up-to-date data is required
- The work processes of transport development planning require intensive preparation and political legitimation
- Transport development planning should be seen as an ‘informal statutory duty’
- Transport development plans tailored to every planning area, ideally across districts in smaller towns

It must be assumed that the European Commission as well as Germany at both federal and state level will increasingly attempt to make transport development plans or SUMP's a statutory duty or basis for state subsidies via laws or incentives. Dynamic changes relevant to planning such as ▷ *Demographic change*, new mobility services, user and PPP funding (▷ *Public Private Partnership*) that will lead to a renaissance in strategic planning with cost and quality management must also be considered.

A more binding system of continuous data provision and the quality management of planning processes are recommended to ensure the quality of transport planning and its implementation (cf. Ahrens 2008: 153).

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