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Enhancing regional potentials in the context of further developing the TEN-T

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A project within the research programme „Demonstration Projects of Spatial Planning (MORO)“ conducted by the German Federal Ministry of Transport and Digital Infrastrucutre (BMVI) supervised by the Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR) within the Federal Office for Building and Regional Planning (BBR).

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Summary

After the adoption of the Lisbon Treaty territorial cohesion has become an objective of EU policies. The Territorial Agenda 2020 (TA2020) aims at realising territorial cohesion by defining several priorities and highlighting that it requires close cooperation between sector and spatial development policies. This cooperation is the main topic of this study. Using the example of trans-European transport networks, linkages between transport and spatial development policy were analysed.

The analyses were conducted in the light of the European guidelines for developing a trans-European transport network (TEN-T). The TEN-T guidelines form the legal framework for this EU sector policy. In Decision No. 1692/96/EG (1996) the main features for the development of a trans-European transport network were laid down. Since then, different adjustments have been made. Not least due to comprehensive changes of the context, a fundamental realignment became necessary. This realignment was done in the context of the revision process completed in December 2013.

Understanding of 'Linking transport networks'

The main objective of the trans-European transport networks is the creation of an integrated transport network. The new TEN-T guidelines regulation (COM(2013) 1315 2013) highlights seamless, save and sustainable mobility in interregional and trans-European passenger and goods traffic as a specific objective of the TEN-T policy. However, the TEN-T must be connected with the regional traffic in order to utilise them for regional economic development beyond TEN-T nodes. A central challenge for the trans-European transport networks sector policy is the improved connection of traffic and transport networks. If spatial development policy aims to support potentials for regional development, it has to consider how to contribute to improved transport network links and how to benefit from it.

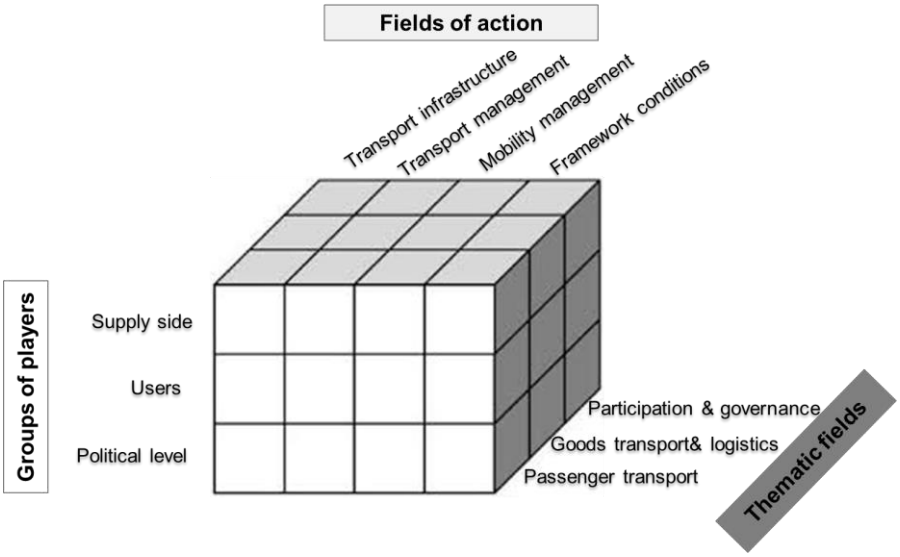
Questions regarding improved transport network links may be differentiated according to content-related aspects and different actor groups. Different challenges result from each perspective. In general, four *fields of action* can be differentiated:

- structural transport infrastructures (political level),
- transport management (supply side),
- mobility management (users),
- development of suitable framework conditions (political level).

The different fields of action overlap and are generally influenced by all actor groups, especially by those primarily responsible. With regards to the content, three *general topics* can be identified:

- passenger transport,
- goods transport and logistics,
- participation and governance.

In principle, each field of action can be differentiated under each of the three topics. There are several possible questions that may be dealt with under the main subject. The following figure illustrates the systematisation of linking transport networks as it is applied in this study. When focusing on regional examples, it becomes furthermore obvious that the tangible problems significantly vary due to the specific regional context.



Regional impacts of trans-European transport networks

Possible territorial and economic impacts of trans-European transport networks in Germany were analysed by means of the development and simulation of transport infrastructure scenarios. The analysis focused on impacts with regard to the development of accessibility, economic growth, employment, and demographic development. The regional economic model SASI (Spatial and Socio-economic Impacts of Transport Investments and Transport System Improvements) was used for this analysis.

According to that, the trans-European transport networks have significant impacts on regional development in Germany. On the one hand, most of the trans-European transport networks in Germany do already exist. On the other hand, infrastructure projects being planned or under construction have considerable impacts in the respective regions. The further development of the TEN-T will have positive impacts on the economic development especially in eastern Germany. However, they may not be overestimated in quantitative terms. Assuming that both the Core and the Comprehensive Network were fully realised, the impact on GDP will be between 0.5 and 1% for the most affected German regions, compared to a scenario without any additional infrastructure. Due to high productivity increases in particular in west Germany, the growth of jobs is lower than GDP growth. In contrast, many regions in particular in Saxony-Anhalt, Mecklenburg-West Pomerania and Brandenburg may expect positive labour market effects as a result of a full TEN-T development.

Regional infrastructure measures that have been analysed in specific regional scenarios have less impact than the Europe-wide extension of the TEN-T. Regional measures that aim at an extensive increase in accessibility have larger

impacts than single projects. However, they also require larger investments which have not been taken into account for this analysis. The effects of single regional measures in regions that show very high accessibility values and economic strengths can be seen in sub-regions. They are, however, of relatively low importance for the whole corridor as such. Other positive impacts of such measures addressing specific problems like capacity constraints or external costs like noise pollution were not considered and analysed with the described model approach.

International practical examples and regional approaches

A number of international project examples exist, all of which dealing with different questions regarding the connection of transport and spatial development. Among these are projects of the European Commission's DG MOVE and DG REGIO, Interreg projects and projects of the Research Framework Programme. The effectiveness of these examples can only be ascertained on the basis of single cases and detailed studies of these single cases. Thus, the practical examples serve as a starting point for the presentation of possible questions and approaches.

By means of selected model regions, it is shown how specific problems are structured depending on the specific territorial context. The German regional examples mainly refer to the corridor sections Rostock-Berlin, Dresden-Prague, and Rhine-Main-Neckar. The first corridor section focuses on questions that are related to rural areas, whereas the other two examples address questions that are typical for densely populated regions and core cities. Some questions and topics result from the specific territorial context, whereas other questions are similar for all regions.

Conclusions

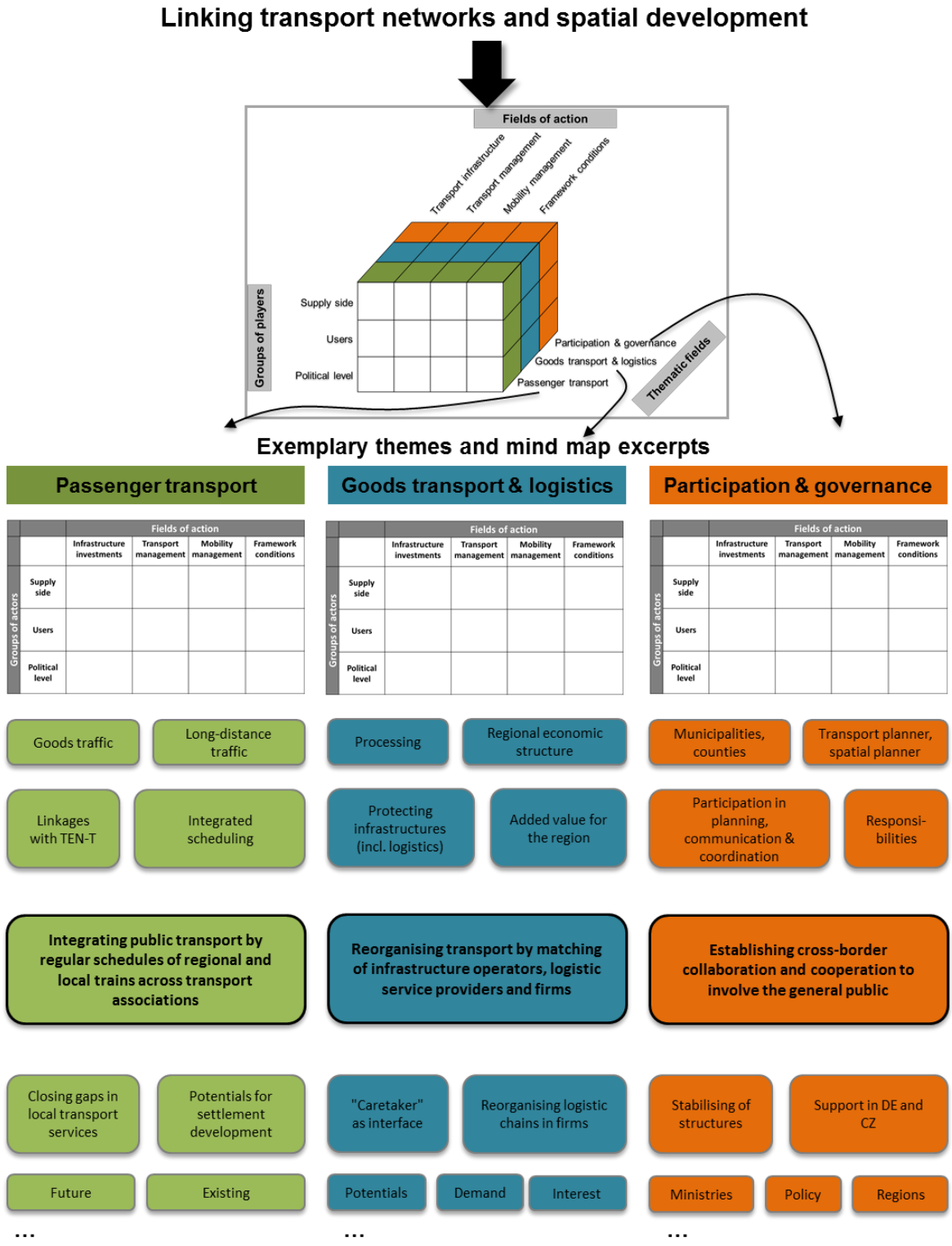
The conducted analyses show that many options for action depend on the territorial context as well as other regional characteristics. In rural regions, questions often refer to ensuring the functioning of transport infrastructures and providing a good level of services. More densely populated regions and core cities, on the other hand, focus on aspects such as overcoming capacity constraints by constructing or upgrading infrastructures or soft measures.

Furthermore, questions regarding accessibility and economic development arise in all types of regions. The objective again varies between regions. Densely populated regions focus on impacts of transport infrastructures on economic growth, whereas rural regions aim at improving regional attractiveness and counteracting out-migration through improved local accessibility.

The figure below illustrates the complexity and variety of selected topics, which are related to the main topic 'Linkages between transport and spatial development'. Based on the question how the connection of transport and spatial development can be promoted and, based on this, regional potential can be developed, different aspects referring to the linkage have been systemised. Potential for regional development exists if spatial development policy directly

contributes to better linkages in the transport sector or the development of approaches. As regards the three identified topics ‘passenger transport’, ‘goods transport and logistics’, and ‘participation and governance’, three approaches from the model regions were selected and visualised in the figure below . Based on the discussions from the regional workshops with stakeholders in the model regions, the complexity of each approach is illustrated in a short mind map. The three mind maps do not include all details, but rather show single aspects. They are to show which aspects were discussed in the model region with regard to a specific topic and thus illustrate the complexity of the addressed challenges.

To come to a conclusion, one can state that international practical examples are used and can be transferred to German regions. However, their implementation needs an intense preparation phase in order to adjust them to the specific context and the precise requirements. A comparison of the topics shows that details often differ, that the stakeholders’ capacity for ‘learning from others’ is limited, or that the level of detail of information available for the international practical examples is not sufficient in order to successfully transfer the example to another context. Nevertheless, the examples include several approaches that may provide new insights and alternative approaches and that may function as ‘eye-openers’.


Linking transport networks and spatial development
Fields of action
Transport infrastructure
Transport management
Mobility management
Framework conditions
Groups of players
Supply side
Users
Political level
Participation & governance
Goods transport & logistics
Passenger transport
Thematic fields
Exemplary themes and mind map excerpts
Passenger transport
Goods transport & logistics
Participation & governance
Fields of action
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Linkages with TEN-T
Integrated scheduling
Integrating public transport by regular schedules of regional and local trains across transport associations
Closing gaps in local transport services
Potentials for settlement development
Future
Existing
...
Processing
Regional economic structure
Protecting infrastructures (incl. logistics)
Added value for the region
Reorganising transport by matching of infrastructure operators, logistic service providers and firms
"Caretaker" as interface
Reorganising logistic chains in firms
Potentials
Demand
Interest
...
Municipalities, counties
Transport planner, spatial planner
Participation in planning, communication & coordination
Responsi-bilities
Establishing cross-border collaboration and cooperation to involve the general public
Stabilising of structures
Support in DE and CZ
Ministries
Policy
Regions
...

1 Introduction

After the adoption of the Lisbon Treaty, territorial cohesion has become an objective of European policies. The Territorial Agenda 2020 (TA2020) aims at implementing territorial cohesion by defining a set of priorities and emphasising that closer cooperation between sector and spatial development policies is necessary. As regards the implementation of trans-European corridors and the core network, transport policy is one sector policy of very high territorial relevance and with very high territorial impacts.[1] Not least because of these impacts, it can be justified to demand a strengthened cooperation between transport and spatial planning, when aiming to improve the connectivity and intermodality of trans-European transport networks with regional transport of passengers and goods as well as regional development.

Both German and many European regions face various challenges. This is also reflected by the revision process of the TEN-T guidelines, which was finalised in 2013. The development of new guidelines was necessary due to changing framework conditions. Passenger and goods traffic increase due to changing economic and settlement structures and transport behaviour. International economic relations become more complex and require new solutions. Demographic change affects both population density and, in the context of ageing, population needs. Road traffic furthermore contributes to greenhouse gas emissions and, thus, to climate change and its different regional impacts. In order to foster the development of clean, safe and efficient transport systems, questions regarding resource efficiency and the integration of modal networks are increasingly gaining attention.

This is where the MORO study 'Implementing the Territorial Agenda 2020: impacts of European sector policies in selected model regions – enhancing regional potentials in the context of further developing the TEN-T' started. Not least by involving the experience of model regions, the study shall answer three groups of research questions. Based on the regional examples, opportunities how to better link trans-European transport networks with regional transport networks and regional development should be analysed. The research questions can be summarised as follows:

- **Economy, employment, accessibility.** Which linkages between regional transport and TEN-T infrastructures are necessary and feasible? Which growth and employment effects may result from improving the accessibility?
- **Governance.** How do traffic planners and spatial planners communicate? How is the public involved in the planning process?
- **Opportunities in model regions.** Which experience does exist as regards linkages between trans-European and regional transport networks? In how far can this experience be used in the model regions? Which opportunities exist for better linkages without major infrastructure expenses?

[1] Cf. Battis and Kersten 2008; BMVBS 2012b; Deutscher Verband für Wohnungswesen, Städtebau und Raumordnung e.V. 2009; van Ravesteyn and Evers 2004

These questions will be especially addressed in Chapters 3 and 4. The following Chapter 2 provides the reader with a short overview on the methodology and includes some basic explanations for understanding the project approach and the addressed questions. Chapter 3 focuses on accessibility, growth and employment effects that result from TEN-T and other transport infrastructure measures. For this purpose, different scenario results are discussed, which take the TEN-T measures listed in the guidelines and additional regional projects for selected German model regions into account. By illustrating practical examples in Chapter 4, mainly the questions of the second and third group are addressed (governance and opportunities in model regions). First, for different challenges affecting German model regions, international experience is presented that may demonstrate how to overcome specific regional challenges. It is supplemented by selected regional approaches of German model regions. In the final Chapter 5, some conclusions are drawn that complement the results discussed in Chapters 3 and 4.

2 Methodology and understanding

2.1 Methodological approach

Working on questions related to enhancing regional potentials in the context of further developing the TEN-T required methodological triangulation. For this purpose, different analytical methods based on quantitative and qualitative data sources were used. This was especially important as this study's aim was not only to analyse these questions theoretically, but also to work with examples for specifying certain aspects.

These in-depth analyses of model regions are based on comprehensive literature and document analyses as well as online research. The analyses were conducted for different topics. Key elements of these analyses were:

- the TEN-T revision process, finalised in 2013, and a compilation of previous TEN-T developments;
- the preparation of different dimensions and elements related to the linking of transport networks;
- the identification of relevant experience of international projects that dealt with questions related to linking transport networks.

In different working steps, the international experience was analysed and processed with regard to its relevance for challenges in German regions:

- For the above-mentioned identification, different databases were searched. Emphasis was put on transnational Interreg projects.
- The projects were analysed regarding their thematic suitability and the availability of meaningful information. This especially concerned the achieved project results.
- A preliminary structure for the analysis was developed. The key elements were short descriptions of the specific project, its relation to TEN-T measures, regions and areas involved and its main components that were considered to be especially interesting and relevant and should be subject to an in-depth analysis.
- After having analysed selected examples, which followed the developed structure, the examples were double-checked by consulting selected regional players. They were asked in how far the examples were relevant for their thematic focus.
- Projects and results, that were considered to be relevant, were investigated in more detail and prepared for discussions with stakeholders from German model regions. The underlying idea was to present the specific experience and to link them to the overall topics and challenges. The summarising assessments of these projects as regards their relevance for single German regions are part of this report (Chapter 4).

Another main element of the MORO study consisted in cooperating with selected model regions in Germany. For this selection the approach of the MORO study was presented in the Transport Committee of the Standing Conference of Ministers responsible for Spatial Planning (MKRO) followed by a call for expressions of interest. The approach aimed at selecting regions that were at

that time dealing with spatial development challenges related to transport development. Besides, the model regions should have different territorial characteristics in order to cover as many different challenges as possible in the MORO study. The objective was

- to involve different types of areas as regards the settlement structure;
- to consider regions differently affected by demographic change;
- to capture different impacts on accessibility;
- to observe coordination processes across federal states and countries and
- to look at both passenger and goods transport.

Within the study no extensive working steps were to be conducted by the regions. Instead, it was more important to identify regions facing different challenges related to the topic of 'linking transport networks' and to accompany their processes during the remaining project duration. Accompanying the regions comprised document analyses on the spatial and transport-related structures of the regions, interviews with main stakeholders on perspectives for linking TEN-T measures with secondary transport networks, to jointly identify problems and challenges related to the overall topic of the MORO study, to make different contributions to the discussions with stakeholders of the model regions and to observe developments related to the specific thematic focuses. Thus, a twofold cooperation approach with the model regions was pursued. On the one hand, the MORO study enriched regional processes with own contributions and stimulated the debate in the regions. On the other hand, conclusions related to challenges and opportunities in the field of linking territorial and transport-related questions should be drawn from the processes observed in the regions, and an in-depth understanding for regional and local perspectives was to be developed. The contributions of the MORO study to the regional discussions mainly comprised

- the illustration of possible and suitable questions and thematic focuses discussed in a working paper on the linking of transport networks;
- the preparation and presentation of potentially suitable international practices that may provide ideas for solutions and
- results from model-like scenarios to illustrate different effects of planned transport infrastructure measures.

In order to implement the exchange and to foster the above-mentioned discussion processes, different workshops were conducted with stakeholders from the model regions. Starting with a joint kick-off workshop with representatives from all model regions the specific thematic focuses and challenges were identified. They were afterwards specified in regional workshops in the related model region and discussed from different perspectives. For this purpose, workshop designs and composition and number of participants were defined conjointly with the specific model region and adapted to the specific thematic focus. Finally, the results from the MORO study and the development of linkages between territorial and transport-related issues in the model regions were presented to a broader expert audience and put up for discussion at a concluding workshop.

Possible territorial and economic impacts caused by TEN-T, i.e. the development of the accessibility in Germany, the outcome for regions with different

developments of accessibility, growth and employment effects, and the demographic development were addressed in this project by means of developing and running scenarios on transport infrastructure. For this purpose, the regional economic model SASI was used.

The SASI model is a simulation model of socio-economic development of regions in Europe subject to exogenous assumptions about the economic and demographic development of the European Union and its neighbouring countries influenced by different transport infrastructure investments, in particular the trans-European transport networks, and other transport policies.[2] The basic idea of the SASI model is to explain the spatial distribution of economic activities and its changes in Europe by regional production functions in which the regional production factors are amended by accessibility indicators as additional explanatory variables, while the production factors labour, capital and knowledge being considered mobile in the long term. The main objective of the modelling framework is to represent the long-term impacts of transport infrastructure investments and other transport policies on the location decisions of firms and households. Thus, the model is able to assess in how far the impacts of the transport policy of the European Union and its Member States correspond to territorial development objectives and regional expectations. Besides many Europe-wide applications[3] the SASI-Model has also been used for regional transport infrastructure projects.[4]

The SASI model differs from other approaches that model regional development by modelling not only production (the demand side of regional labour markets) but also population (the supply side of regional labour markets). In doing so, it is possible to also model labour supply and unemployment. A further feature of the SASI model is its dynamic transport infrastructure database. The network database contains all important historical network changes since 1981 as well as the planned network development according to the latest EU documents on the development of the trans-European networks.

The SASI model has six forecasting sub-models: European developments, regional accessibility, regional GDP, regional employment, regional population and regional labour force. A seventh sub-model calculates socio-economic indicators with respect to efficiency and equity. The indicators of the SASI model are calculated for the European NUTS-3 regions, i.e. for Germany the model provides indicators at the administrative level of counties and autonomous cities.

In this study, a set of interrelated scenarios for the development of European and national or regional transport infrastructure was formed and simulated by means of the SASI model with respect to their impacts. Different elements of regional transport infrastructure were taken into consideration in the scenarios developed for the model regions.

[2] Cf. Wegener and Bökemann 1998; Wegener 2008
[3] Spiekermann and Wegener 2014
[4] Cf. Spiekermann and Wegener 2005; 2013

2.2 What does 'linking transport networks' mean?

The key objective to be pursued by trans-European transport networks consists in creating an integrated transport network. The new TEN-T guidelines[5] highlight that the specific objectives of the TEN-T policy include to allow the seamless, safe and sustainable mobility of persons and goods. The specific objectives should be mainly achieved by establishing interconnections and interoperability between transport networks.[6] Improving the multimodality of traffic and transport networks can thus be identified as the main challenge for the sector policy of trans-European transport networks.

If spatial development policy intends to contribute to the development of trans-European networks and the promotion of potentials for regional development, it consequently has to reflect on how to contribute to better transport networks and how to benefit from it. One example for a territorial starting point can be found in the Territorial Agenda 2020 (TA2020): Here, it is emphasised that an integrated network does not only require to further develop trans-European networks but also to develop secondary networks at local and regional level and to improve the linkages between primary and secondary transport systems.[7]

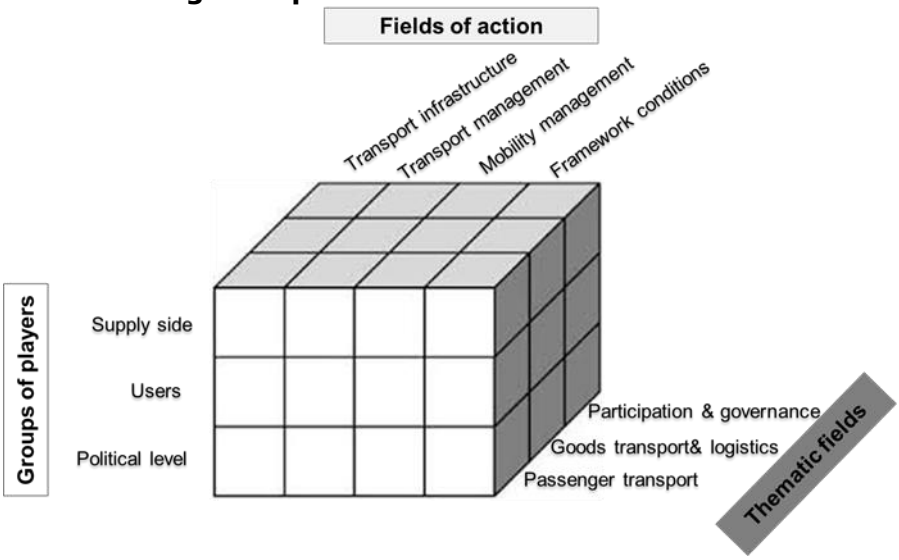
In principle, the following four fields of action can be identified both for goods and passenger transport:

- transport infrastructure (political level),
- transport management (supply side),
- mobility management (users),
- development of suitable framework conditions (political level).

The fields of action necessarily partly overlap and are generally influenced by all groups of players (indicated above in brackets), but usually the main responsibility for one field is up to one group. Depending on the perspective, different challenges arise for the improvement of the transport networks. A multi-dimensional structure (Figure 2-1) results from combining the four fields of action, the three groups of actors and the two transport-related thematic fields (passenger transport, goods transport and logistics) plus one additional thematic field related to 'participation and governance'.

[5] COM(2013) 1315 2013
[6] Cf. COM(2013) 1315 2013: 1
[7] Cf. TA2020 2011: para. 36

Figure 2-1: Linking transport networks as a multi-dimensional challenge



In the next step, different possible starting points can be derived from the presented systematic structure of 'linking transport networks'. These starting points may firstly refer to the transport connections of a region with the trans-European transport network, i.e. the linkage between primary and secondary networks. Secondly, they may refer to regional and spatial development oriented toward the specific corridor. Even though infrastructure measures are mentioned due to the consequences for other fields of action, this study focused on less costly, often 'soft' measures.

Then, the relevance of single fields of action is explained for both passenger and goods transport. It is complemented by explanations regarding participation and governance approaches, which are equally relevant for passenger and goods transport, and from which other relevant topics can be deduced.

2.2.1 Passenger transport

Transport infrastructure does not only refer to the construction and upgrading of roads, railways and waterways. Interfaces both between different network levels (vertical dimension) and between different transport modes (horizontal dimension) are of major importance for developing a multi- and intermodal and spatially integrated transport network. Especially changing the transport mode at interfaces entails obstacles of use. Thus, the changing process should be organised as easy and straightforward as possible. Constructional conditions of both transport routes and hubs form the infrastructure basis for intermodal passenger transport. However, the study does not primarily focus on transport infrastructures. Nevertheless, selected questions may aim to identify common requirements or may aim at interregional coordination.

In this context, socio-demographic change is a good example that entails specific requirements that will have to be increasingly considered in the future. Several starting points result from this change that have to be considered for halts and hubs (incl. their surrounding) and for vehicles, especially as regards barrier-free accessibility (multi-sensory principle, access, lifts, low-floor vehicles).

Transport management means the improvement of traffic flows in existing transport infrastructures. Especially for local public transport, traffic flows are defined by timetables. By using integral fixed-interval timetables, individual lines are coordinated within an overall timetable minimising transfer time and maximising the number of accessible connections. As a consequence for the structure of the timetable of single lines, the main objective is not fast transport ('as fast as possible') but that arrival and departure times fit with the overall timetable ('as fast as necessary'). In order to optimally connect primary and secondary networks, local and regional connections as well as the arrival and departure times for long-distance traffic have to be considered when developing the overall timetable.[8] Currently, a feasibility study is conducted analysing the implementation of a nationwide integral fixed-interval timetable ('Deutschland-Takt').[9] Besides the development of timetables, transport management furthermore comprises instruments for traffic management and traffic control.

Mobility management focuses on transport users and may comprise different territorial levels. It is generally suitable for connecting primary and secondary networks. Good mobility management is based on providing intermodal offers for an integrated use of different transport modes and corresponding communication with the potential user. Different measures to promote traffic prevention, a modal shift, and low-emission traffic management generally contribute to CO_2 reduction.[10] Based on the four pillars information, communication, organisation, and coordination, six fields of action can be identified:[11]

- **Information.** The general public is provided with comparatively unspecific information such as maps, timetables, road and route information.
- **Advice.** Focused analyses and recommendations for optimising mobility behaviour are offered to defined target groups (enterprises, administrations).
- **Raising awareness.** Information material is produced, disseminated and a reflection of one's own mobility behaviour is initiated by means of campaigns (e.g. in schools).
- **Supply organisation and coordination.** Providers of transport services are encouraged to cooperate in order to simplify multi-link, i.e. intermodal transport chains.
- **Sale and reservation.** Multimodal transport services are offered via mobility centres as one-stop services, i.e. intermodally and customer-friendly.
- **New mobility services.** Collective agreements (e.g. job ticket, student ticket) simplify the use and intermodal combination of existing transport services.

Framework conditions. At all territorial levels, political and administrative stakeholders have to create the necessary legal and traffic planning conditions that may affect all above-mentioned fields. Thus, they range from route planning and timetable development to ticket systems and accessible design of transport

[8] Cf. Bundesamt für Verkehr 2011: 3
[9] In this context, the BAG-SPNV (Federal Working Group on Regional Rail Transport) demands to use first results of this study as a basis for the evaluation for rail projects in the Federal Transport Infrastructure Plan 2015. These results, however, would have had to be available at the beginning of 2014 (BAG SPNV, VCD and PRO BAHN 2013).
[10] Cf. Region Hannover 2011: 26
[11] Cf. Kanton Aargau 2007: 7f.

hubs and vehicles. Political and administrative players should cooperate in order to ensure accessible design and to stepwise implement a joint overall timetable with minimal transfer times. By coordinating spatial development and sector policies, interfaces in the transport system can be planned for the long term in a way that they comply with both current and future requirements. Integrating spatial development and infrastructure policy may provide the basis for coordinating the development of the transport network with long-term, large- and small-scale settlement, urban, and regional development in a way that intermodal mobility behaviour is also promoted between primary and secondary networks.

2.2.2 Goods transport and logistics

Transport infrastructure. As for passenger transport not only the construction and upgrading of infrastructures but also interfaces are of major importance for goods transport. Interfaces for goods transport are in particular ports, airports, rail freight terminals as well as multimodal platforms and cargo centres. Relevant characteristics of multimodal transfer points do not only refer to the structural design but also to infrastructure management (e.g. opening hours, turnaround times, waiting times).[12]

Requirements for the hub areas and their specific hinterland result from the conception of trans-European networks and the national infrastructure planning. For instance, land requirements in the surrounding of ports are increasing. It is furthermore necessary to reserve land for holding and waiting areas in the hinterland. Along the main axes of the road network, the demand for truck stops and rest areas for respecting rest periods will increase.[13]

If the regional demand for multimodal transport solutions cannot be identified in the initial phase, the construction and upgrading of multimodal transfer points is often restricted in the beginning.[14] In such situations, future-oriented planning is characterised by securing locations and potentials for future and possibly phased extensions.

Transport management. In addition to the requirements mentioned in the previous section regarding the management of transport infrastructures, transport management on the user and supply side should take account of the three levels of logistics. The first level covers the functional specialisation as regards transportation, transshipment and storage by means of infrastructure and operational preconditions. The second level refers to the coordination of the logistics chain and the third level aims at a targeted design and structure of logistical flows.[15]

Besides an adequate enhancement of the infrastructure, an adapted infrastructure management is also as essential for goods transport as it is for passenger transport. As regards traffic routes, models are conceivable that prioritise goods transport during peak periods. Peak periods depend on the type

[12] Cf. Vallée 2012: 10
[13] Cf. ibid.: 7
[14] Cf. Vallée 2012: 10
[15] Cf. Voß 2007: 28

of logistics. Regional hubs mainly cover regional flows over short distances (< 100 km); their peak time is early in the morning and in the evening (4-8 a.m., 5-9 p.m.). In logistic core areas, bundling and transhipments within national reach (< 500 km) concentrate so that an increase in goods traffic can be expected during the night (11 pm – 2 am).[16] Selectively prioritising goods transport reduces delays, simplifies flows in the logistics chain and reduces user reluctance resulting from expected delays. Instruments that are capable of precisely identifying and forecasting the needs of regional goods traffic can be integrated in the planning processes at higher levels.

Mobility management. The four mentioned pillars of mobility management for passenger transport can also be transferred to goods transport: information, communication, organisation and coordination. The fields of action, adjusted to the preconditions of goods transport and slightly modified, may again be differentiated. Here they mainly address the demand side of goods transport, i.e. enterprises whose goods are to be transported:

- **Information.** Potential users (mainly enterprises) are provided with comparatively unspecific information such as timetables, opening hours, operating periods, and route information.
- **Advice.** Focused analyses and recommendations for optimising logistic chains are offered to defined industries.
- **Raising awareness.** By means of campaigns information material is produced and given to enterprises in order to inform them about new opportunities regarding intermodal goods transport at an early stage.
- **Supply organisation and coordination.** Providers of transport services are encouraged to cooperate in order to simplify multi-link, i.e. intermodal transport chains and to achieve additional cost savings in return for economies of scale.
- **Sale and reservation.** Multimodal transport services are offered as one-stop services, i.e. intermodally and customer-friendly.

Framework conditions. Framework conditions that directly affect goods transort and framework conditions related to planning regulations are to be distinguished.

Goods transport is directly affected by (1) infrastructures and transportation means, (2) management and usage of infrastructure, and (3) services and regulations for the specific transport mode. Nevertheless, the integration of transport modes has to be carried out on all three levels. There is an additional fourth level referring to horizontal activities as research and development, liability regulations or Europe-wide round tables.[17] The development of European and/or cross-border standards is an aspect that is particularly relevant for goods traffic.

Framework conditions related to planning law especially refer to regional and urban land-use planning. There are management potentials in order to promote intermodal goods traffics. Regional planners can assume a strategic role as a

[16] Cf. Vallée 2012: 7
[17] Cf. COM(1997) 243

moderator and coordinator and initiate a dialogue with operators, chambers, municipalities, associations, and project developers; they can take the initiative in the multi-stage selection process for logistic locations, stimulate intermunicipal cooperation or identify macro locations that comply with the objectives and principles as they are defined for regional planning.[18] Establishing regional growth cores and intermunicipal industrial sites may contribute to securing available land for logistics-related land use.

2.2.3 Participation and governance

In order to design infrastructure policy in a way that it contributes to tackling existing challenges for goods and passenger traffic, transport and spatial development should be better integrated and form an intermodal, cross-regional, and multilevel policy.[19] In order to consider local framework conditions in the planning process, local actors should take the initiative for a multilevel, i.e. vertical approach. Other levels should contribute correspondingly by providing information or platforms for mutual exchange, for example.[20] A cross-regional perspective of traffic congestion is appropriate because traffic flows do not adhere to local or regional borders but prefer the line of least resistance. A cross-sector, i.e. horizontal approach that considers different aspects related to transport and spatial development but also nature and economic development, takes future settlement developments into consideration when programming timetables for passenger transport. Aspects related to accessibility should also be included when planning industrial sites. This applies to both regional employees and (supra-)regional transport for the delivery and collection of goods. Furthermore, synergies between goods and passenger traffic can be developed. Good local public transport connections of industrial sites entail potentials to reduce the increase in motorised individual transport, for example. Sparsely populated areas that additionally face the challenge of population decline may develop synergies to maintain services of general interest by combining goods and passenger traffic, i.e. using combined transport vehicles.[21]

Transport projects – irrespective of whether they primarily affect goods or passenger traffic and irrespective of whether they address local, regional or supra-regional traffic – are often poorly accepted by the population, which worries about an increase of noise and exhaust pollution, an undesired change of the landscape or the depreciation of their properties. Such projects therefore require patience and the conviction of the involved players that the investment will pay off in the long run. Intermunicipal operator models, participative approaches and new financing methods may contribute to establishing a basis in order to overcome initial obstacles and difficulties. By dealing with related topics such as local public transport, open space planning or social infrastructures in terms of integrated spatial development and/or spatial planning and discussing participative models involving investors and enterprises, potentials for synergies

[18] Cf. Vallée 2012: 5f., 11
[19] Cf. ARL 2009: 1
[20] Cf. BMVBS 2012b: 33
[21] Cf. Wuppertal Institut 2005: 47

might be identified and even new added values might be developed when logistic centres are planned, for example.[22]

The Federal Ministry of Transport and Digital Infrastructure lists eleven success factors for using participative approaches:[23]

- discussion at eye level and fair treatment increasing credibility,
- designing participation as a process with an open outcome rather than using it as a tool for pacification,
- soundly identifying all interest groups (analysing groups of players and target groups),
- specifically advertising participation,
- continuous and early participation (scopes for decision-making must exist),
- transparency of processes, objectives, opportunities and deadlines,
- preparing commonly understandable information,
- showing potential influence and legal and economic limitations,
- supporting the development of participatory and communication competences,
- planning the participation process in a result-driven and proactive way,
- acceptable cost-benefit ratio for the participation process.

The corridor platforms, each to be chaired by a European coordinator and to be established according to the new TEN-T guidelines, shall be a special instrument for supraregional and cross-border planning and the coordination of TEN-T core network corridors. Besides the involved Member States and the specific infrastructure operators, other public and private bodies can also participate. For each core network corridor, a work plan has to be set up by the Member States and the corridor platform. This plan shall contain characteristics, bottlenecks, objectives, required measures, a study on the multimodal transport sector, and an implementation and investment plan, and has to be submitted to the European Commission. If the regions are involved adequately, it can positively influence and promote cooperation and transparency.

[22] Cf. Vallée 2012: 6
[23] Cf. BMVBS 2012a: 18f.

3 Regional impacts of trans-European transport networks

The possible effects of the trans-European transport networks on spatial and economic development, i.e. the changes in accessibility in Germany, the consequences for regions with different future paths of accessibility, the growth and employment effects and the demographic development, were analysed in this project by defining and simulating transport infrastructure scenarios. For this the regional economic model SASI was applied (see Chapter 2). This chapter first presents the defined scenarios and then their impacts on regional development in Germany and concludes with the impacts in the three model regions.

3.1 Analysed scenarios of transport infrastructure development

To analyse the regional impacts of the TEN-T, a set of cumulative scenarios for the development of European and national or regional transport infrastructure was developed. In total, six scenarios were defined; besides a reference scenario, two scenarios were derived from the TEN-T programme, and three more scenarios include complementary infrastructure measures in the model regions (see Table 3-1).

At first a Reference Scenario 00 investigates how German regions would develop if in future only the infrastructure of today plus the links planned to be constructed by the year 2016 would be in place. The other scenarios differ from the Reference Scenario in the assumptions about the extent of the further implementation of the TEN-T and possible regional projects.

The two Scenarios T1 and T2 reflect different implementation levels of the TEN-T. For Scenario T1 it is assumed that only the core network in Europe will be implemented. The scenario also includes those transport infrastructure projects that are already in the stage of implementation. Scenario T2 contains, beyond the core network, the transport infrastructure projects of the comprehensive TEN-T network.

The three Scenarios T3, T4 and T5 include all elements of Scenario T2 and additional national and regional transport infrastructure projects linked with the TEN-T and relevant for the regions. Scenario T3 for the Dresden model region includes the implementation of the German and trans-border sections of the high-speed rail line Dresden-Prague. Scenario T4 for the Berlin-Rostock model regions assumes a significant acceleration of slow rail links in the federal states of Brandenburg and Mecklenburg-West Pomerania as proxy for a better linkage of regional, national and international rail services. Scenario T5 for the Middle Rhine-Main-Neckar model region includes the upgrade of rail links from Frankfurt to Fulda and Würzburg, the integration of Darmstadt in the high-speed rail line Frankfurt-Mannheim and the upgrade of a relief route from Karlsruhe to Koblenz along the western bank of the Rhine River, mainly for goods transport.

Table 3-1: Scenarios analysed

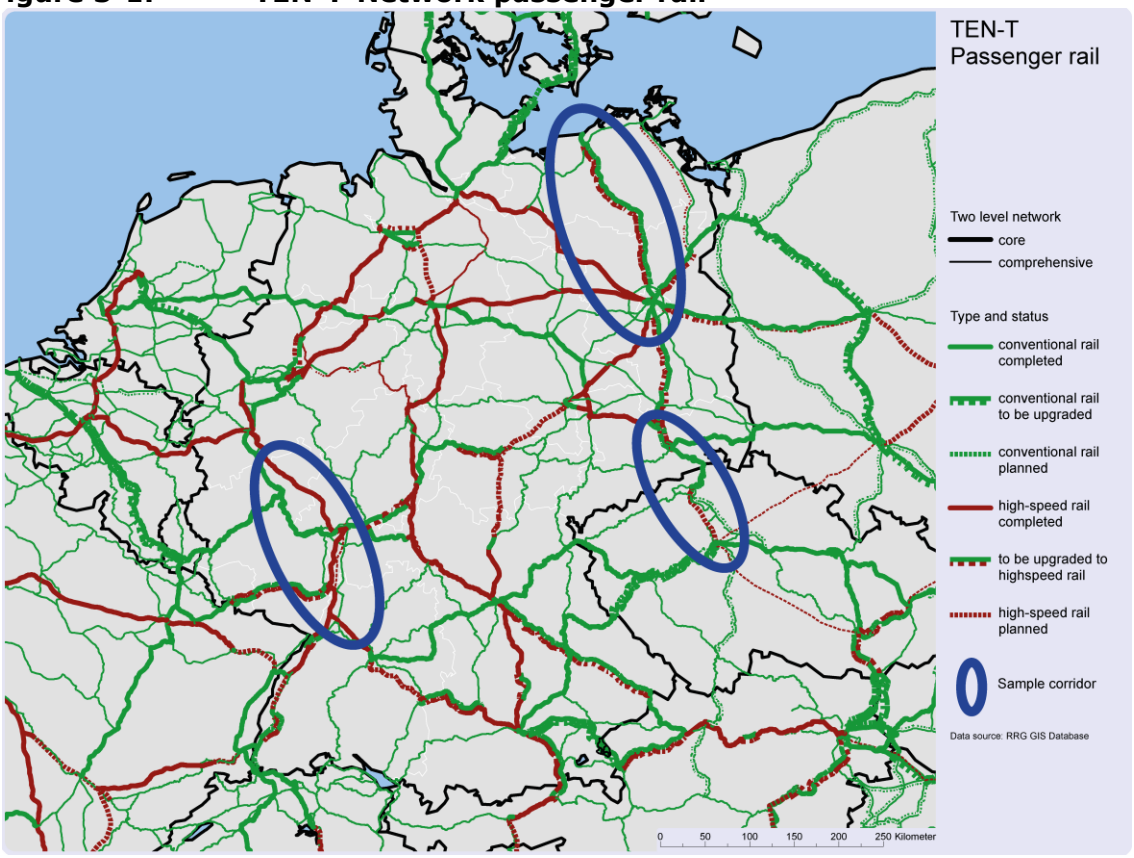
Scenario	Transport infrastructure development
00 Reference Scenario	Scenario 00 only contains existing transport infrastructure and links implemented by 2016 ("Do-nothing-scenario").
T1 TEN-T Core Network	Scenario T1 contains in addition to Scenario 00 the transport infrastructure projects of the TEN-T core network as well as projects that are already in the implementation phase.
T2 TEN-T Comprehensive Network	Scenario T2 contains in addition to Scenario T1 the additional transport infrastructure projects of the TEN-T comprehensive network.
T3 Regional Scenario Corridor Dresden-Prague (Dresden model region)	Scenario T3 contains in addition to Scenario T2 the new construction of the German and of the cross-border sections of a high-speed rail line Dresden-Prague with a stop in the Czech region of Ústecký in the city of Ústí nad Labem as well as an acceleration of the current route through the Elbe valley.
T4 Regional Scenario Corridor Berlin-Rostock (Berlin-Rostock model region)	Scenario T4 contains in addition to Scenario T2 a substantial acceleration of slow rail sections in the Federal States of Brandenburg and Mecklenburg-West Pomerania.
T5 Regional Scenario Corridor Koblenz-Mannheim (Middle Rhine-Main-Neckar model region)	Scenario T5 contains in addition to Scenario T2 the upgrade of rail links from Frankfurt to Fulda and Würzburg, the integration of Darmstadt in the high-speed rail line Frankfurt-Mannheim and the upgrade of a relief route from Karlsruhe to Koblenz along the western bank of the Rhine, mainly for goods transport.

As the SASI Model is a dynamic model in which each year is simulated, the scenarios were implemented with a temporal differentiation. This means that the individual infrastructure projects are included in the model network only from the year onwards in which they are expected to become operational. The time horizon for the scenarios is the year 2051, because some of the transport infrastructure projects, in particular those of the TEN-T comprehensive network will only be implemented in twenty or thirty years.

Figures 3-1 und 3-2 show the TEN-T outline plans for rail passenger traffic and road traffic for Germany and the neighbouring regions according to the new TEN-T guidelines[24], which served as a base for the definition of Scenario T1 with the core network and Scenario T2 with the comprehensive network. The maps reproduce the official maps of the European Commission[25], however the real situation and the situation on the maps might differ in a few cases.

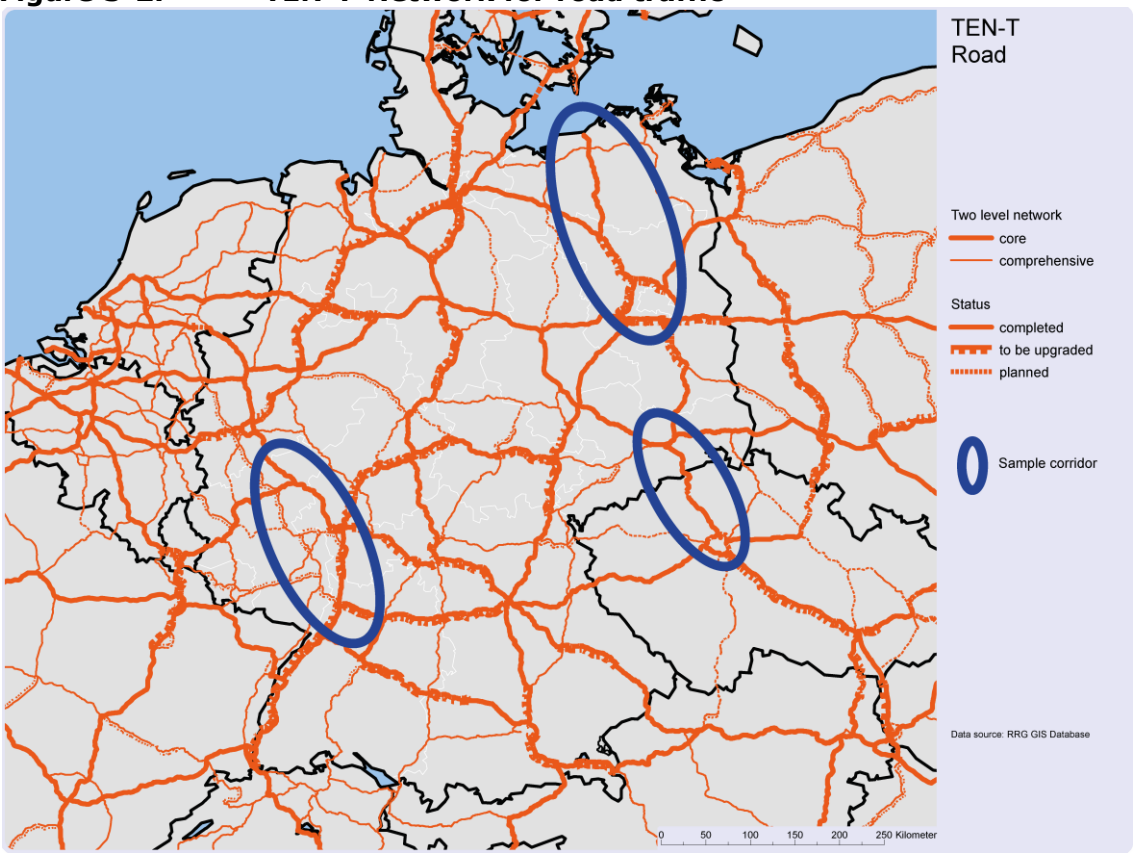
[24] COM(2013) 1315 2013
[25] COM(2013) 1315 Annex 1

Figure 3-1: TEN-T-Network passenger rail



Source: Reproduced according to the COM(2013) 1315 guidelines, Annex 1

Figure 3-2: TEN-T-Network for road traffic



Source: Reproduced according to the COM(2013) 1315 guidelines, Annex 1

3.2 Regional impacts in Germany

This section presents the main results of the Reference Scenario 00 and the two TEN-T Scenarios T1 Core Network and T2 Comprehensive Network regarding accessibility, gross domestic product, employment and population change.

The SASI model uses four different accessibility indicators. Two of them, one being a combination of accessibility of road and rail and the other being a combination of road, rail and air, reflect accessibility for passenger travel. The two other reflect accessibility for freight transport, one road accessibility by lorry and the other a combination of accessibility by road and by rail for freight. Accessibility indicator values for a region are calculated as the sum of GDP in all European regions weighted by a function of travel impedance. For travel impedance, general transport costs are estimated as a combination of monetised travel time, real travel costs and in the SASI model also of social, cultural and political barriers between the European countries. All accessibility indicators are used for this study, however, only the accessibility by road and rail for passenger travel is presented in this report.

The development of the transport infrastructure in Europe changes the accessibilities. Figure 3-3 shows this in a highly aggregate manner as averages over time for the European Union (EU27), for the EU member states before 2004 (EU15), for the new EU member states since 2004 (EU12) and for Germany. What is visible are the large increases of accessibility of the last 30 years induced by infrastructure development but also by the growing European integration. In this comparison, Germany has the highest average accessibility, EU12 the lowest. In the Reference Scenario 00 by definition no more increases of accessibility occur beyond 2016. After 2016 the impacts of the TEN-T developments in Scenarios T1 and T2 can be seen. Accessibility increases compared to the reference happen in all aggregate territories considered in the diagram. The highest growth in accessibility is to be expected for EU12. In those countries the TEN-T Comprehensive Network (T2) produces further increases in accessibility compared to the TEN-T Core Network (T1), because numerous projects will be implemented in the comprehensive network in this part of Europe. In contrast to this, the differences between T1 and T2 are relatively small in EU15 and Germany, because in these parts of Europe only very few transport infrastructure projects belong to the TEN-T comprehensive network.

The highest accessibility in Europe is found in Germany in a corridor along the Rhine River and in Belgium and a few neighbouring regions of France and the Netherlands (Figure 3-4). This is the combined result of the GDP concentration together with good transport infrastructure and service supply for all modes of transport. From this central area of Europe, accessibility is declining rapidly in particular towards Eastern Europe.

Accessibility effects of the TEN-T are presented in Figures 3-5 and 3-6 as relative differences of the two scenarios compared to the Reference Scenario 00. Regions in the western parts of Germany will have the lowest accessibility increases of about ten percent, as these regions have the highest accessibility level and can only expect limited transport infrastructure improvements by the TEN-T. Regions in the new German Länder will see highest accessibility changes of up to twenty

percent compared to the Reference Scenario. These regions will benefit from the TEN-T projects located in them, in particular from the additional projects of the comprehensive network compared to the core network, and also from the large infrastructure development in the neighbouring countries of Eastern Europe. It can be seen that the accessibility increases of German regions as well as those of nearly all Western European regions will be clearly lower than in the regions of EU12.

The aggregate development of GDP in the Reference Scenario 00 and in the two TEN-T Scenarios T1 and T2 are presented in Figure 3-7. The economic growth of the past as well as the significant decline in GDP by the recent economic crisis and the recovery of the growth path become visible for the four aggregates. What is almost non-visible at these aggregate levels are the effects of the TEN-T development. The blue lines representing the Scenarios T1 and T2 are only slightly above the line of the Reference Scenario.

The spatial differentiation of the 00 Reference Scenario demonstrates that regional economic disparities will continue to exist in Germany and more pronounced in Europe (Figure 3-8). The regional differentiation of the effects of the TEN-T on the economy is, however, clearly visible (Figures 3-9 and 3-10). The changes in economic development follow more or less the changes in accessibility. The highest GDP increases compared to the Reference Scenario are to be expected in the regions of the new German Länder. As expected, the impacts of the TEN-T Comprehensive Network (T2) are higher than those for the TEN-T Core Network (T1). The regional economic impacts induced by the TEN-T in Germany will be at a maximum of one percent of additional GDP compared to the Reference Scenario, however, in most regions significantly below one percent. That means that high accessibility growth results in economic benefits, but also that the relative GDP growth remains much behind the growth in the accessibility.

Similar impacts are to be expected on the labour market (Figures 3-11 and 3-12). In the Reference Scenario, the larger cities and regions in western Germany will have employment gains compared to the base year of the simulation, 1981, but most regions in eastern Germany and some rural counties in western Germany will not keep their level of employment (Figure 3-11). For the TEN-T scenarios, the high growth in productivity in the most important economic sectors in western Germany have the effect that the employment growth effect of the TEN-T is relatively lower than the GDP growth (Figure 3-12 for Scenario T2). This is particularly true for the agglomerations. However, many regions in Saxony-Anhalt, Mecklenburg-West Pomerania and Brandenburg can expect positive labour market effects of about one percent of additional employment through the full implementation of the TEN-T in Scenario T2 compared to the Reference Scenario 00. Significant positive labour market effects can be also expected in Emsland, Saxony, Thuringia, in northern parts of Hesse and in the northern and eastern regions of Bavaria.

The demographic effects of the TEN-T are more complex and closely linked to Europe-wide economic effects. The Reference Scenario 00 shows that in 2051 nearly all regions in the new German Länder as well as the regions in EU12 will have strong population decreases compared to the base year 1981 (Figure 3-13).

This has to a large extent already happened in the past years. Regions in western Germany, however, only show a slight decrease or even a slight increase in southern Germany; whereas other western European regions show a clear population growth. The TEN-T, however, will not lead to population growth as might be expected from the positive economic development, but to a slight reduction (Figure 3-14). This can be explained by the much larger positive economic effects in EU12 leading to less outmigration from there to Germany than without the TEN-T.

Figure 3-3: Accessibility travel, Scenarios 00, T1 and T2, 1981-2051

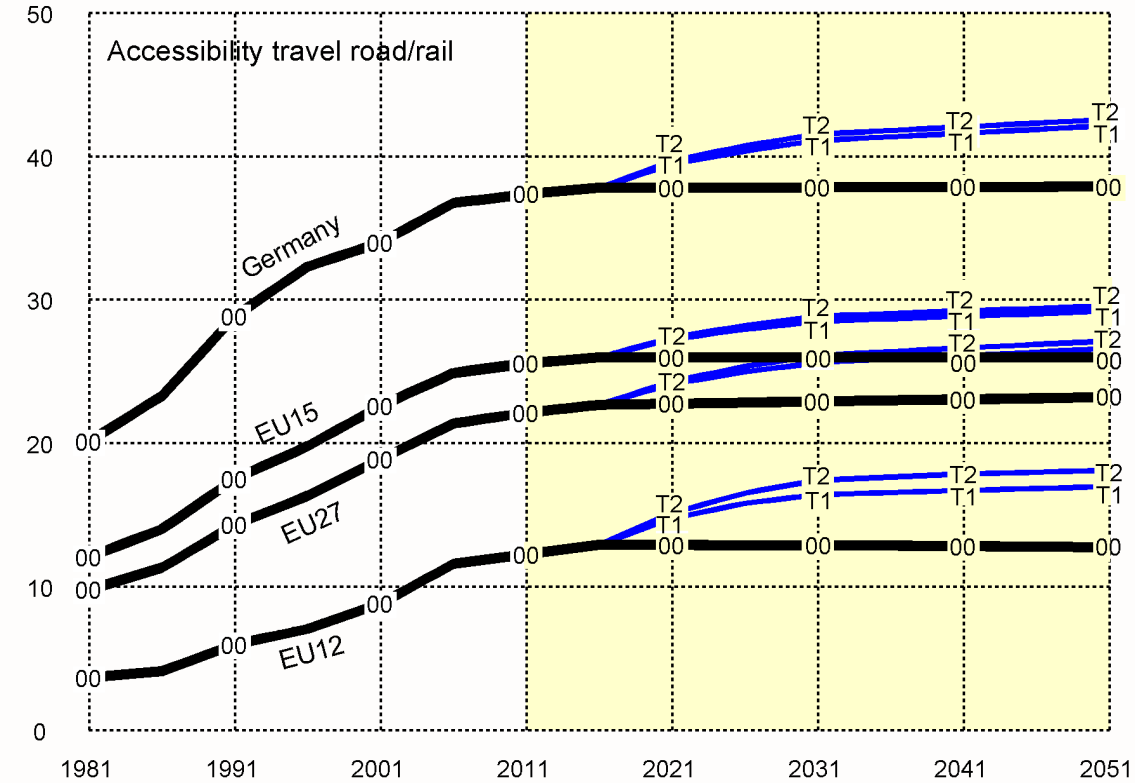


Figure 3-4: Accessibility travel, Reference Scenario 00, 2051

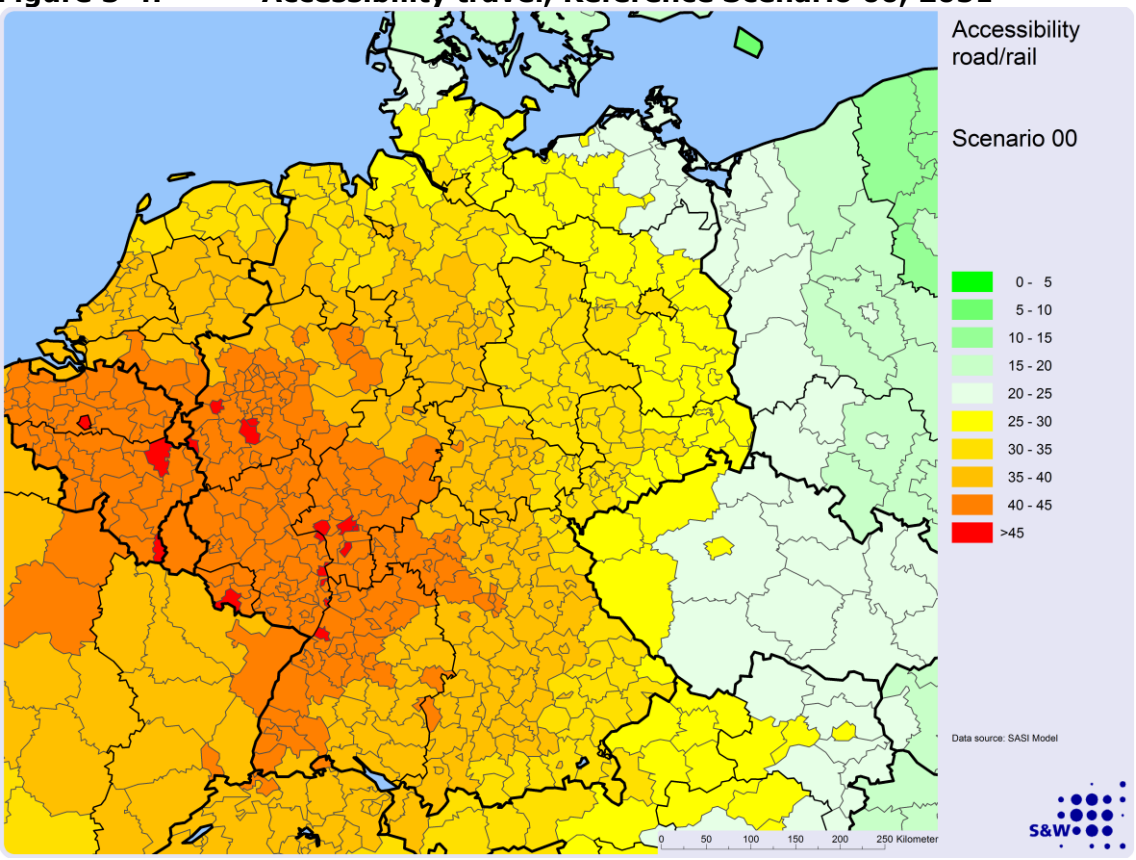


Figure 3-5: Accessibility differences, Scenario T1 to Reference Scenario 00, 2051

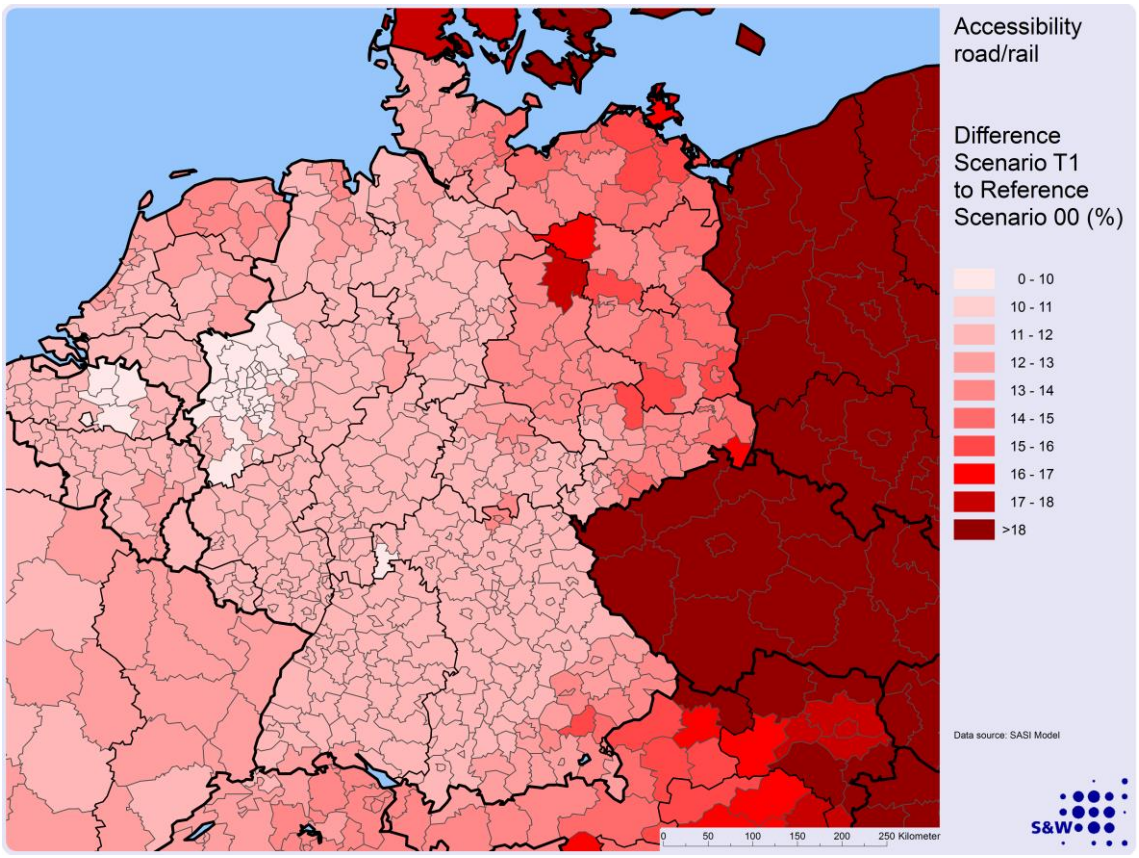


Figure 3-6: Accessibility differences, Scenario T2 to Reference Scenario 00, 2051

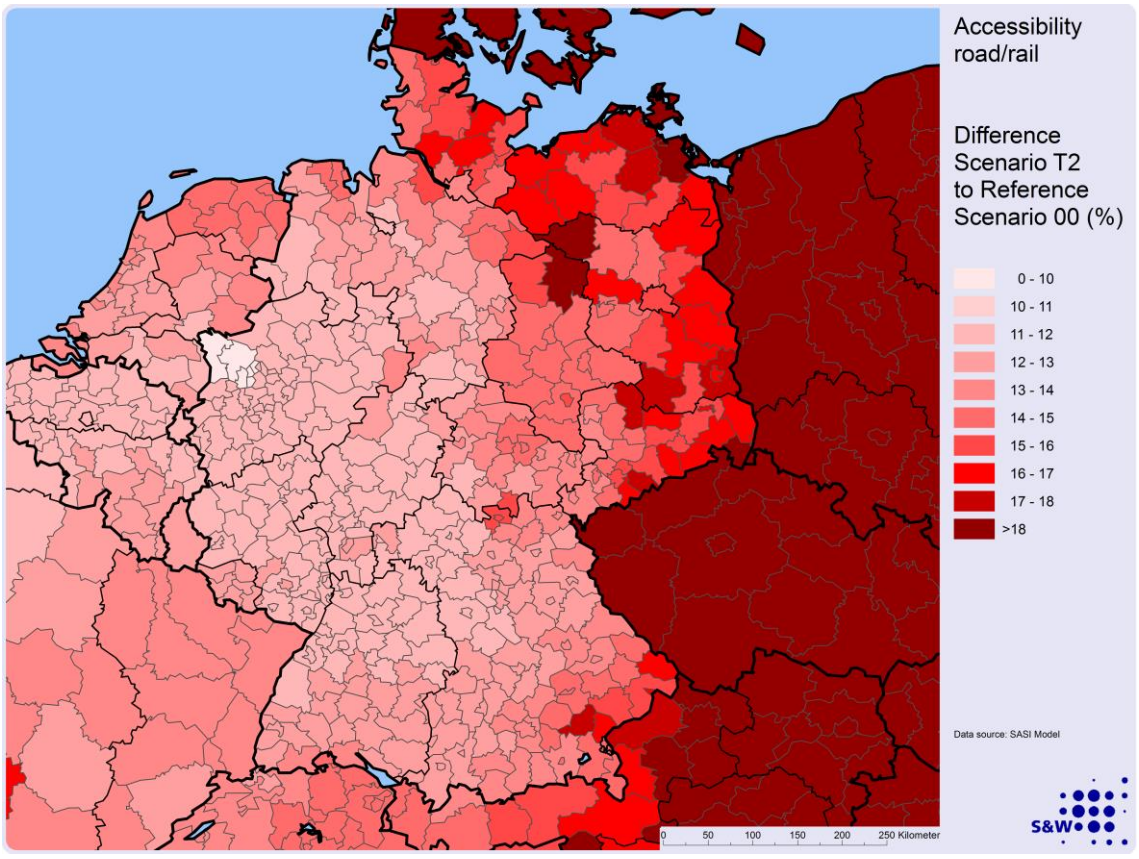


Figure 3-7: GDP per capita, Scenarios 00, T1 and T2, 1981-2051

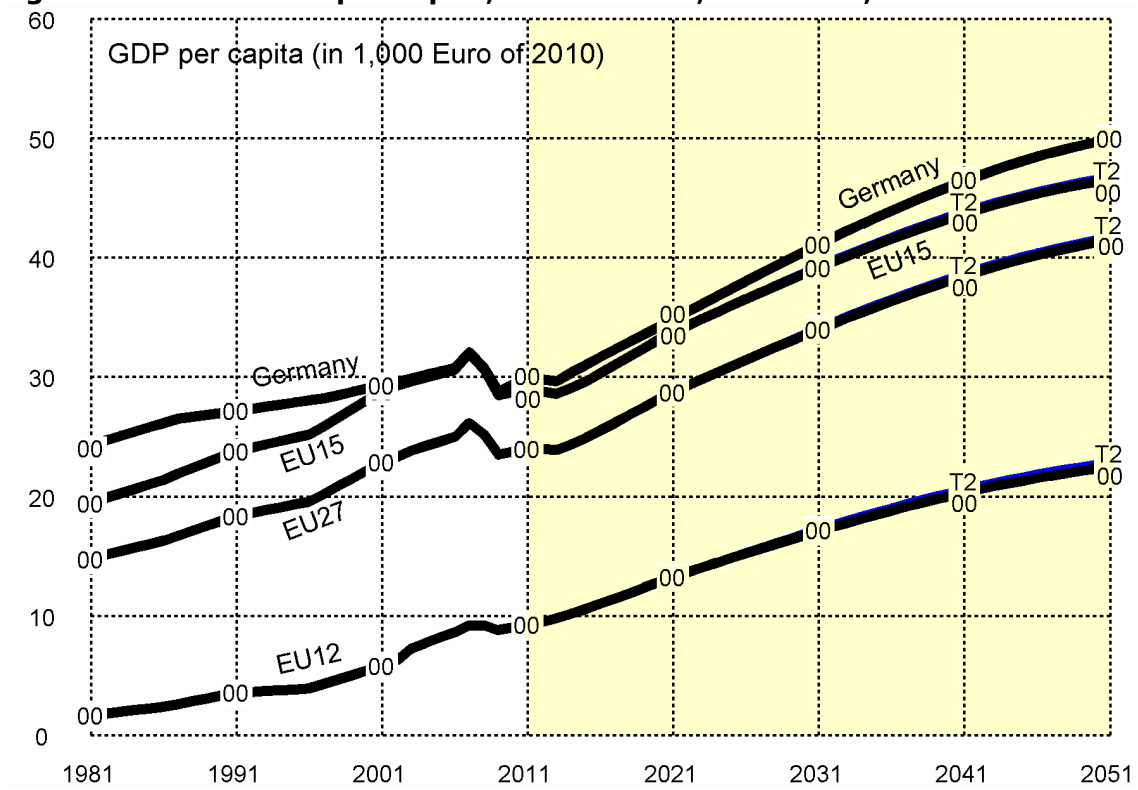


Figure 3-8: GDP per capita, Reference Scenario 00, 2051

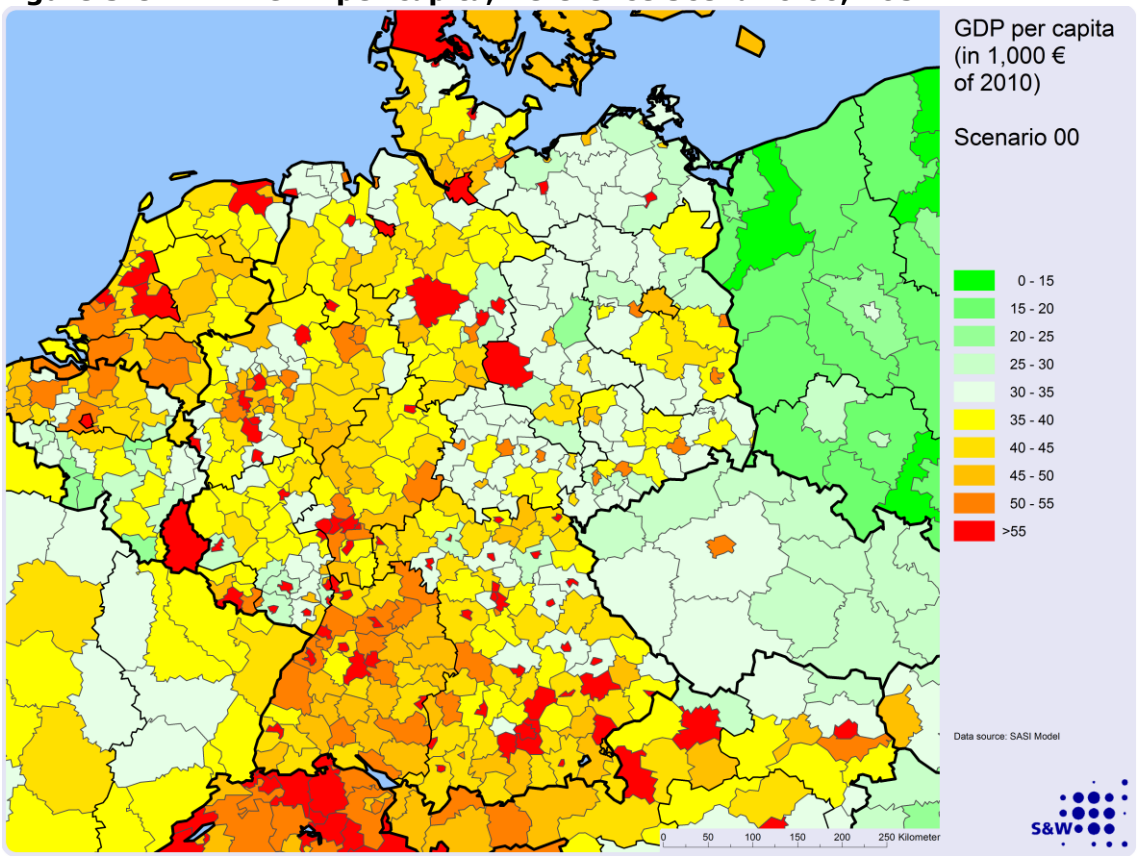


Figure 3-9: GDP differences, Scenario T1 to Reference Scenario 00, 2051

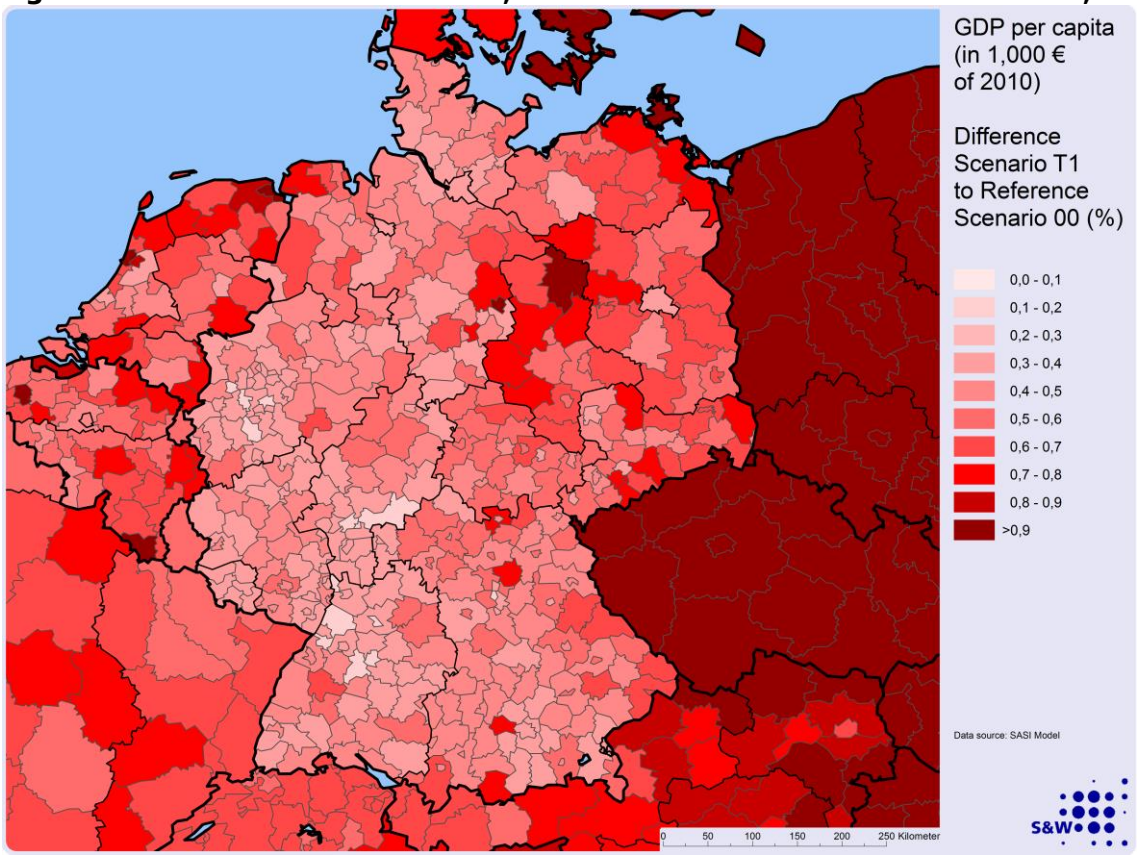


Figure 3-10: GDP differences, Scenario T2 to Reference Scenario 00, 2051

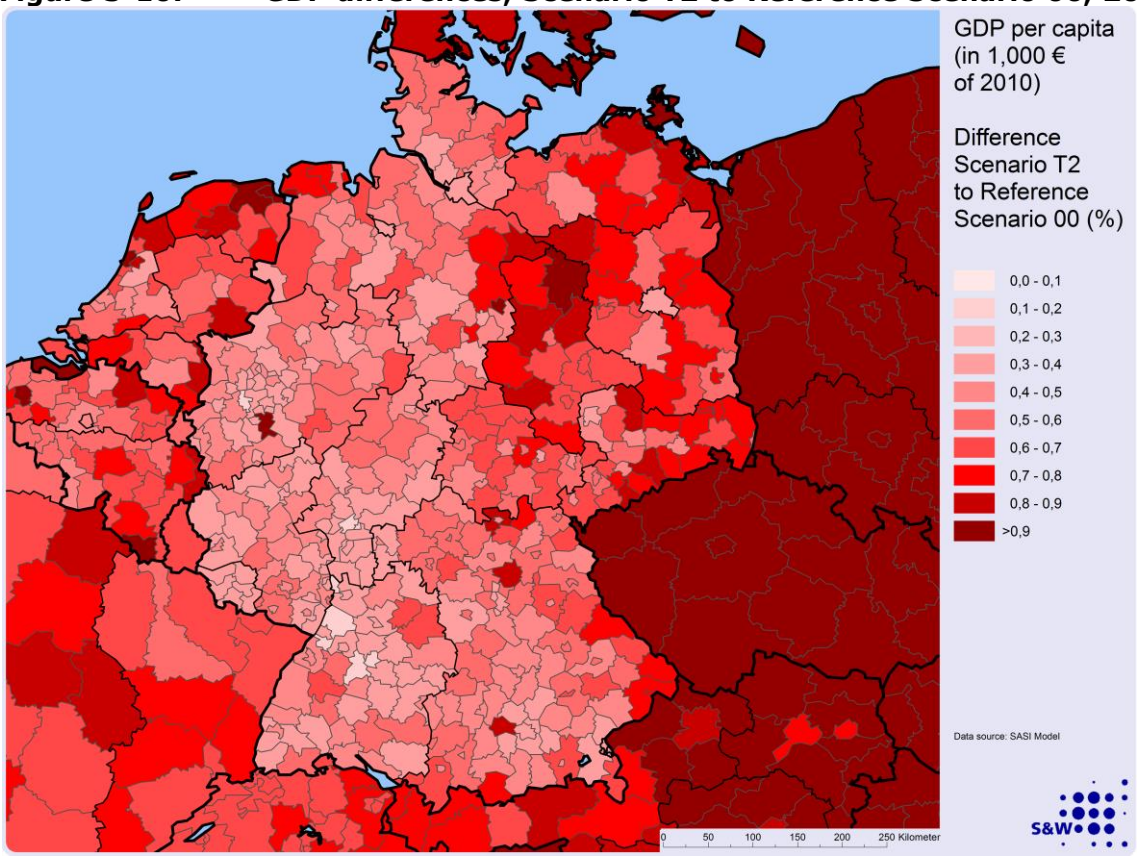


Figure 3-11: Employment, Reference Scenario 00, 2051

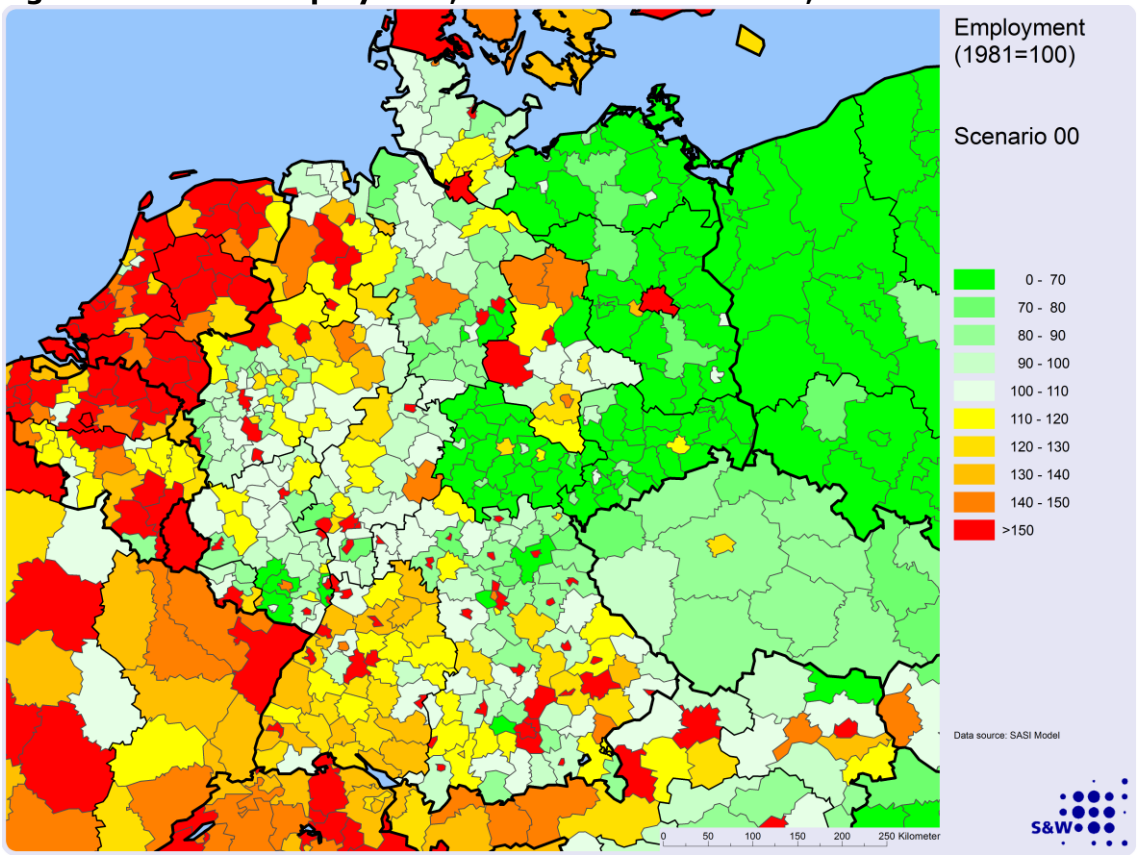


Figure 3-12: Differences in employment, Scenario T2 to Reference Scenario 00, 2051

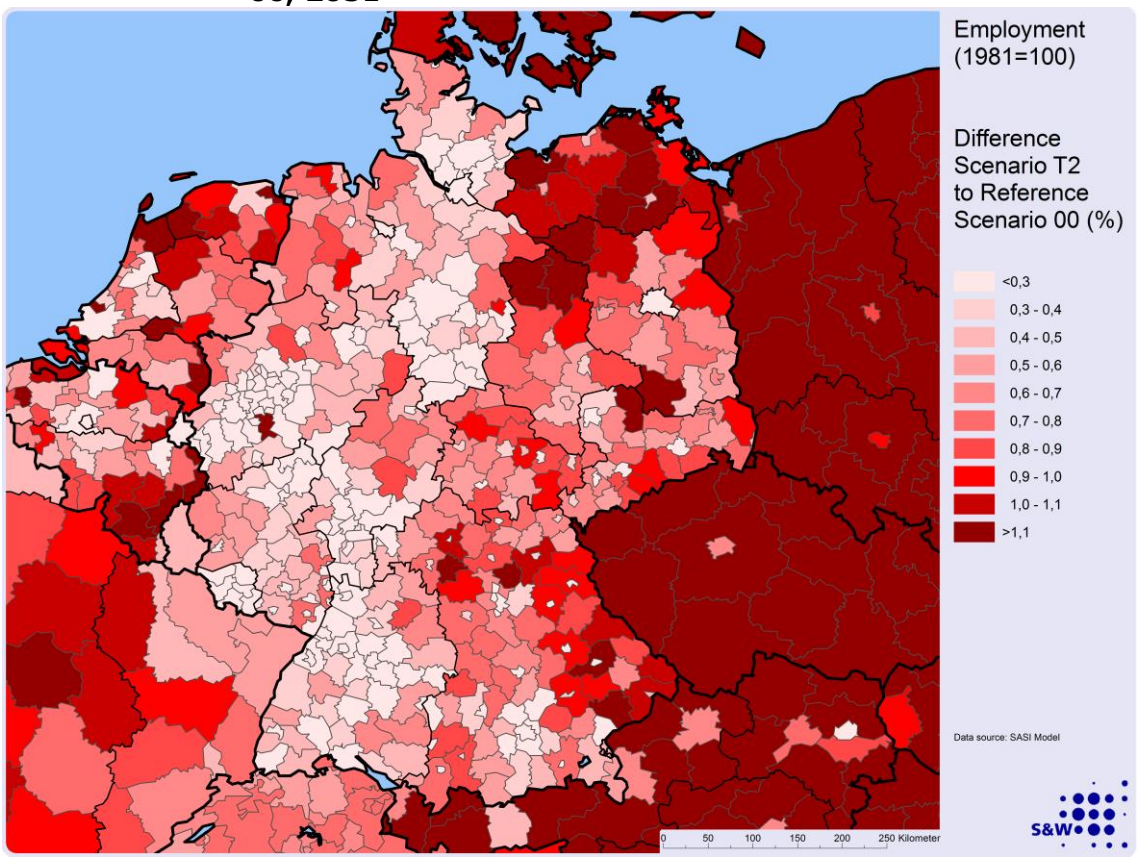


Figure 3-13: Population, Reference Scenario 00, 2051

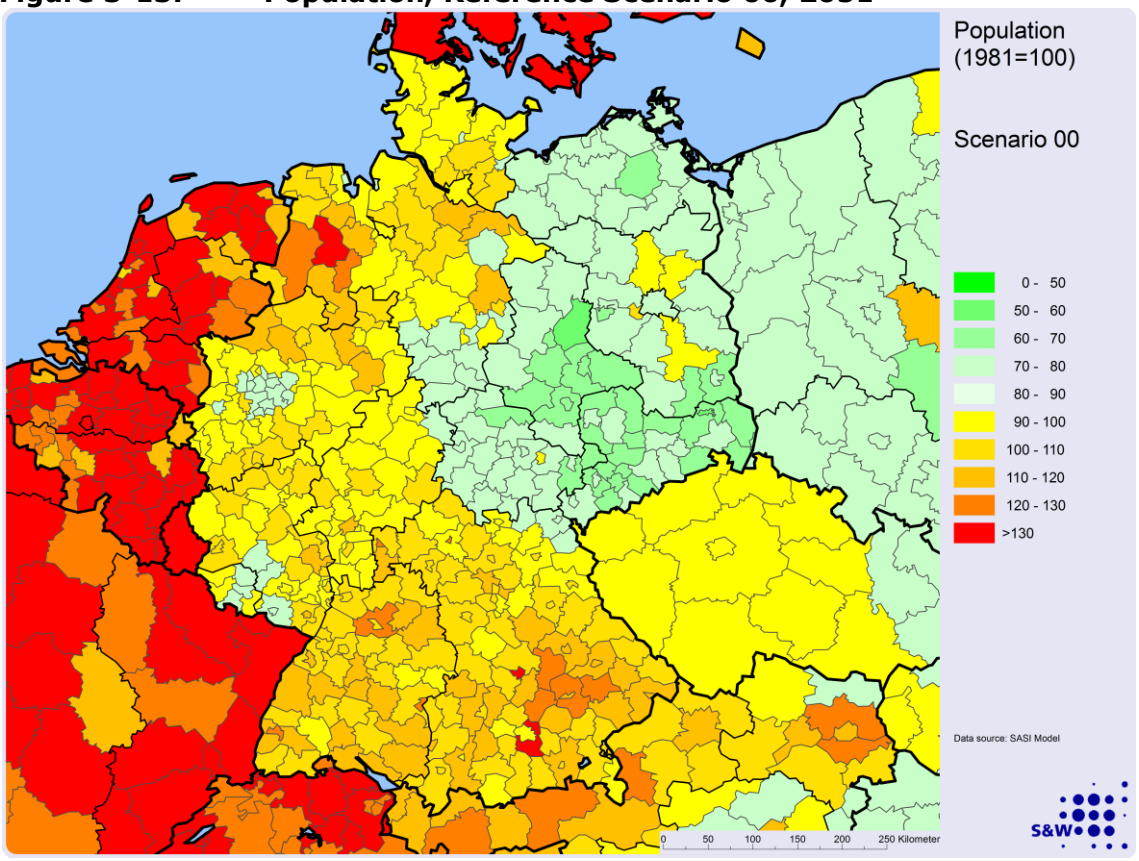
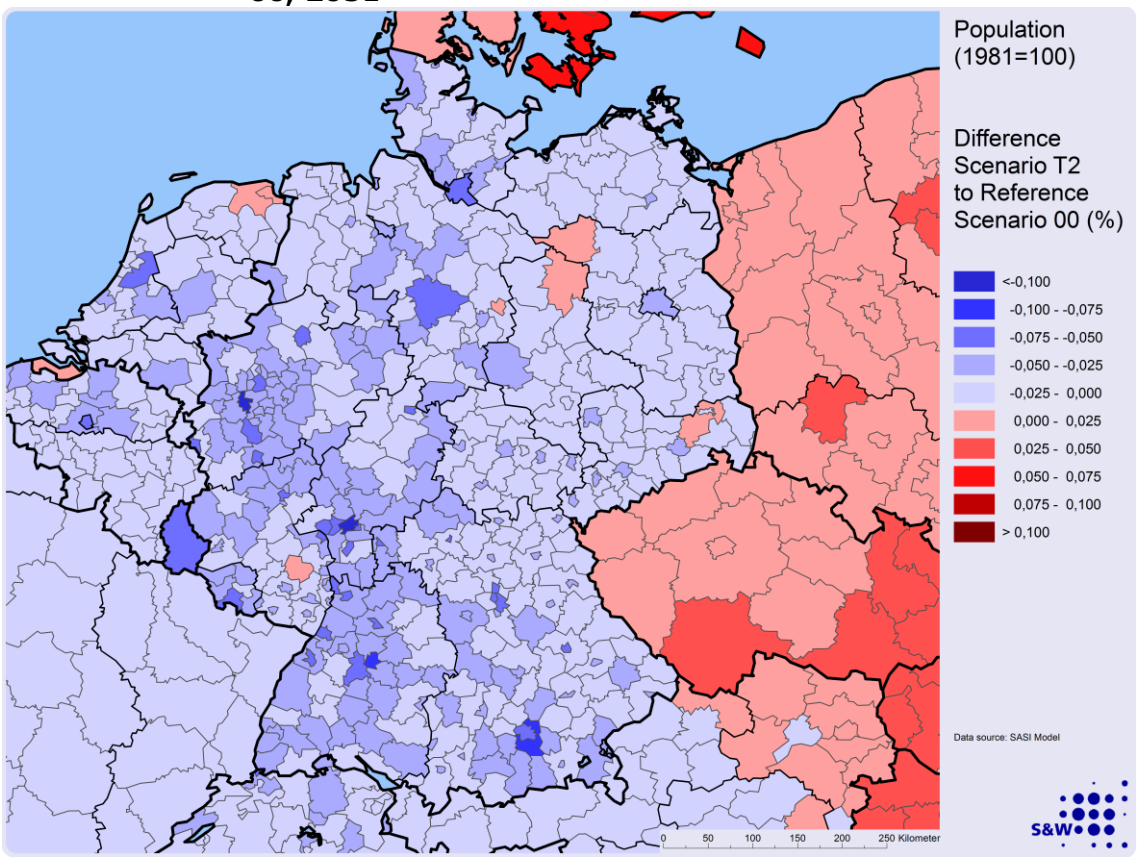


Figure 3-14: Differences in population, Scenario T2 to Reference Scenario 00, 2051



3.3 Regional impacts in model corridors

In this section the main results of the three very different regional Scenarios T3, T4 and T5 for the sample corridors are presented in the context of the Reference Scenario 00 and the two TEN-T Scenarios T1 and T2. The summary of impacts focuses on the effects on accessibility and GDP.

The German part of the Dresden-Prague corridor on average has a higher accessibility than EU27, but a lower one than Germany (Figure 3-15). The corridor shows clear accessibility increases by the TEN-T scenarios. A Czech section of the high-speed rail line Dresden-Prague was already included in Scenarios T1 and T2. The implementation of the German and cross-border sections of this high-speed rail line with an interim stop in Ústí nad Labem (Scenario T3) results in additional accessibility gains of the corridor. Highest accessibility increases of Scenario T3 compared with the TEN-T Comprehensive Network scenario (T2) are to be expected in Dresden and its surroundings, in Prague and its surroundings and in the Czech region Ústecký between Prague and the border (Figure 3-16). However, the accessibility increases are not larger than 1.5 percent. This results in correspondingly low additional economic effects (Figures 3-17 and 3-18). The additional GDP of the Saxon regions is at 0.05 percent maximum above GDP in Scenario T2. Nearly twice as high is the relative gain in some Czech regions meaning that Prague and its surroundings will receive somewhat higher relative economic benefits from a fast connection to Dresden than Dresden and its surroundings. The highest relative growth is to be expected in the Ústecký region by the assumed stop of the high-speed trains in the city of Ústí nad Labem and the good connections to Dresden as well as to Prague.

The Berlin-Rostock corridor has a lower average accessibility than Germany as a whole but is clearly above the average accessibility of EU27 and in particular of EU12 (Figure 3-19). The TEN-T scenarios T1 and T2 will clearly increase the accessibility of the corridor. For this corridor, a completely different regional scenario was defined. In Scenario T4 it was assumed that an acceleration of slow rail links in Brandenburg and Mecklenburg-West Pomerania enables to better integrate the regions into the TEN-T networks and thus into the European economy. The highest accessibility gains of Scenario T4 compared to the TEN-T Comprehensive Network Scenario T2 are about 3.0 percent (figure 3-20). The resulting impacts on the economy are relatively low, but differ concerning the spatial distribution (Figures 3-21 and 3-22). The highest additional gains in GDP of Scenario T4 compared to Scenario T2 are about 0.1 percent and located in Stralsund and Rügen. Remarkably, regions in Poland as well would strongly benefit from the regional acceleration measures.

The Middle Rhine-Main-Neckar (Koblenz-Mannheim) region has the highest accessibility of all sample regions being above the German average and belonging to the highest in the European Union (Figure 3-23). The TEN-T development will bring additional gains in accessibility to the corridor. However, the effect of the measures assumed in Scenario T5, i.e. the upgrade of rail lines from Frankfurt towards Fulda and Würzburg as well as the upgrade of a rail connection mainly for freight transport between Karlsruhe and Koblenz, west of the main corridor, is limited due to the already very high level of accessibility

(Figure 3-24). Accessibility gains in the core of the corridor are very low, some effects in the area of Fulda and Würzburg and along the upgraded western freight bypass are visible. Here, accessibility increases of up to 2.0 percent compared to the TEN-T Comprehensive Network Scenario T2 are likely. The additional GDP growth induced by the TEN-T is also relatively low (Figure 3-25). The spatial pattern of these economic effects of Scenario T5 follows the pattern of accessibility changes with highest increases of GDP compared to the TEN-T Comprehensive Network Scenario T2 of 0.05 percent along the western bypass route (Figure 3-26).

To summarise, it can be concluded that the TEN-T will have significant impacts on regional development in Germany. On the one hand, the TEN-T in Germany to a high degree are already in operation, on the other hand, the additional transport infrastructure projects will have clear effects in the benefitting regions. The further implementation of the TEN-T will have positive economic effects in particular in the regions of eastern Germany. However, in quantitative terms, those effects may not be overestimated. The GDP in the most benefitting regions after the full implementation of the TEN-T will be only between 0.5 and 1.0 percent above a hypothetical situation in which no new transport infrastructure would be built. The effects on the labour market are even lower than the increase of GDP. However, for several regions in Saxony-Anhalt, Brandenburg and Mecklenburg-West Pomerania the full implementation of the TEN-T will have positive labour market effects of up to 1.0 percent of additional jobs compared to the 'Do-Nothing' Reference Scenario.

Regional accompanying measures as analysed in Scenarios T3, T4 and T5 have a lower impact intensity than the Europe-wide development of the TEN-T. Regional measures aiming at a widespread increase of accessibility as in Scenario T4 have higher impacts than single projects as in T2, but most likely also face higher costs, which were not analysed here. Single regional measures in regions with already high accessibility and economic power as in Scenario T5 have visible effects in parts of the regions, however, the overall effect for the whole corridor being relatively low. Other positive effects of such measures, as for instance the removal of capacity problems or the reduction of external costs like noise exposure, have not been analysed with the modelling approach of this study.

Figure 3-15: Accessibility travel, Scenarios 00, T1, T2 and T3, 1981-2051

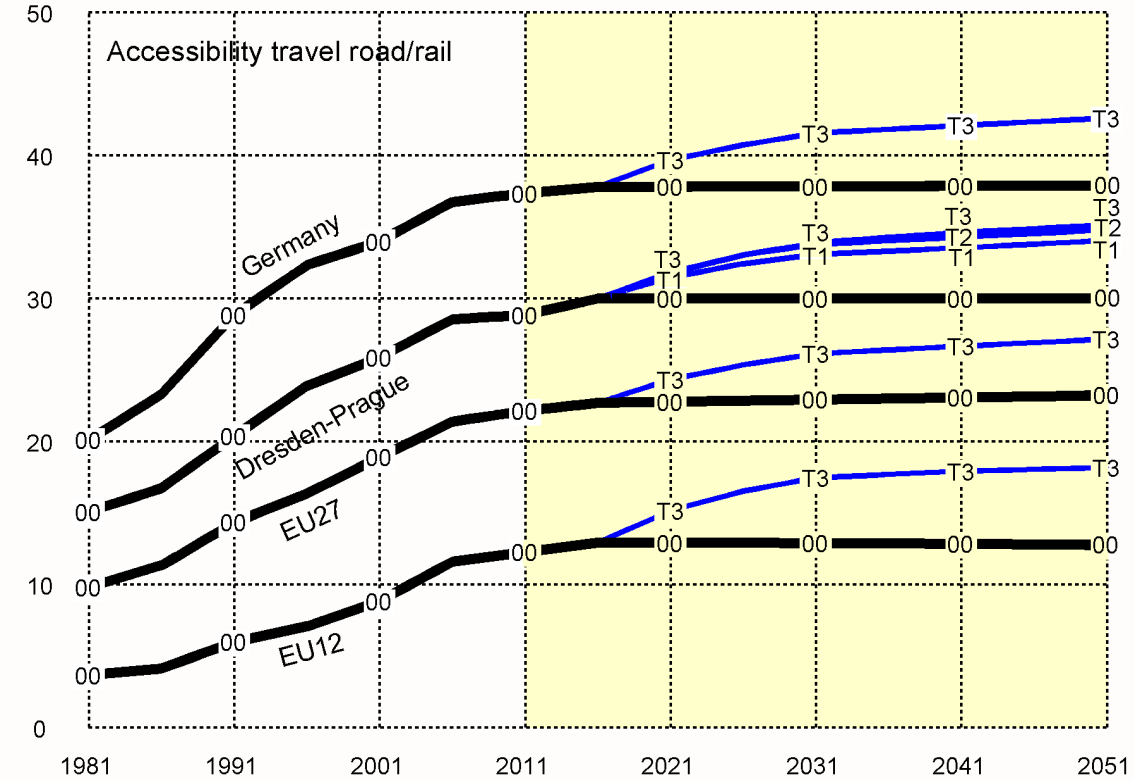


Figure 3-16: Dresden-Prague corridor, differences in accessibility, Scenario T3 to Scenario T2, 2051

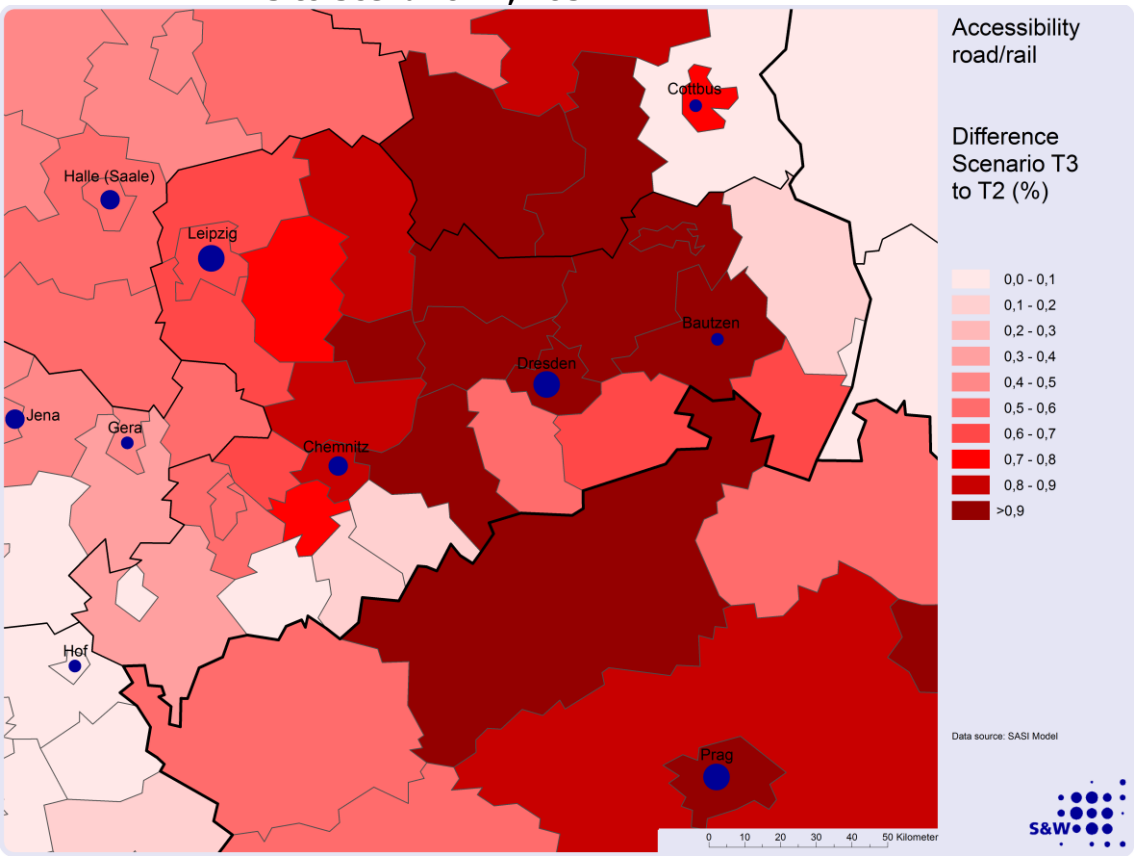


Figure 3-17: GDP per capita, Scenarios 00, T1, T2 and T3, 1981-2051

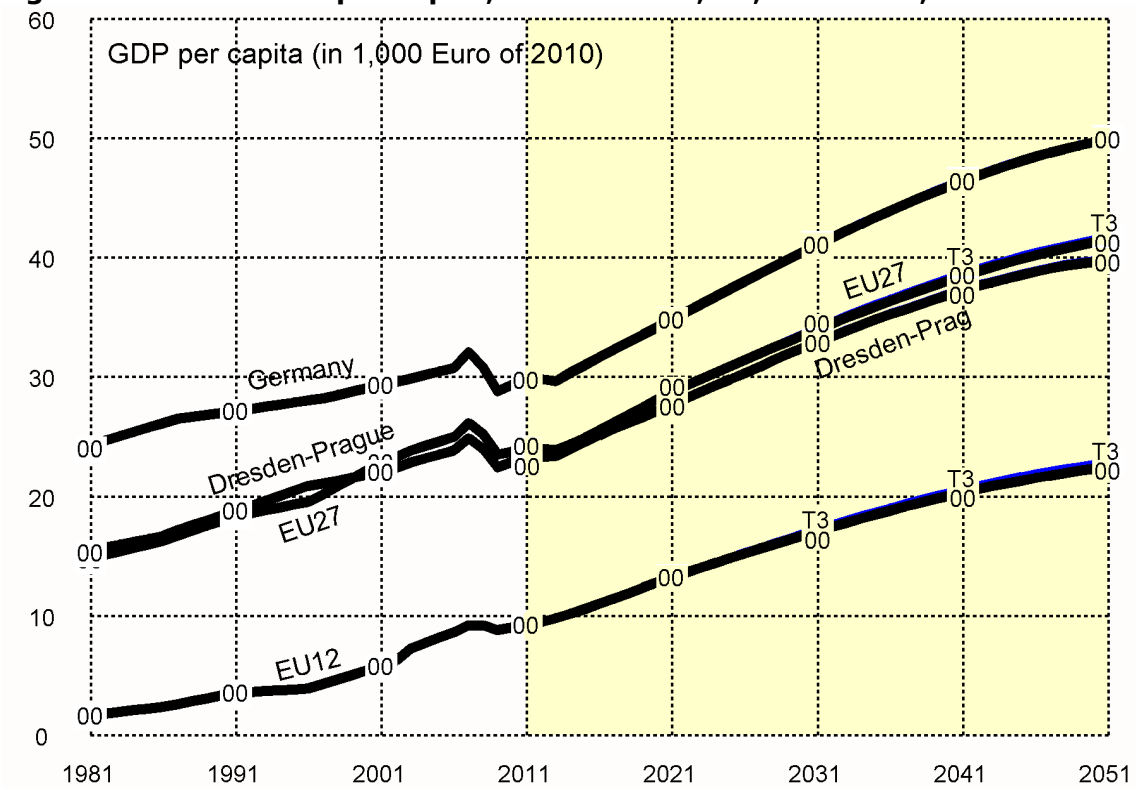


Figure 3-18: Dresden-Prague corridor, differences in GDP, Scenario T3 to Scenario T2, 2051

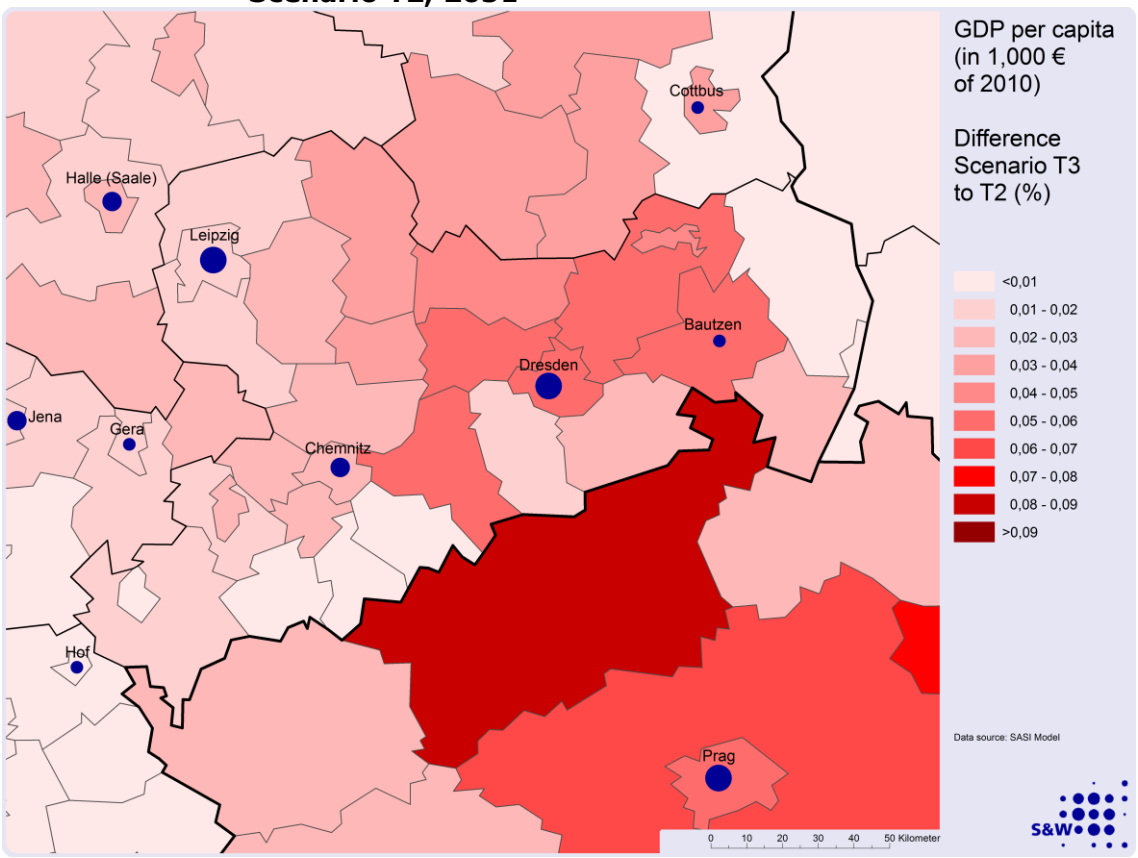


Figure 3-19: Accessibility travel, Scenarios 00, T1, T2 and T4, 1981-2051

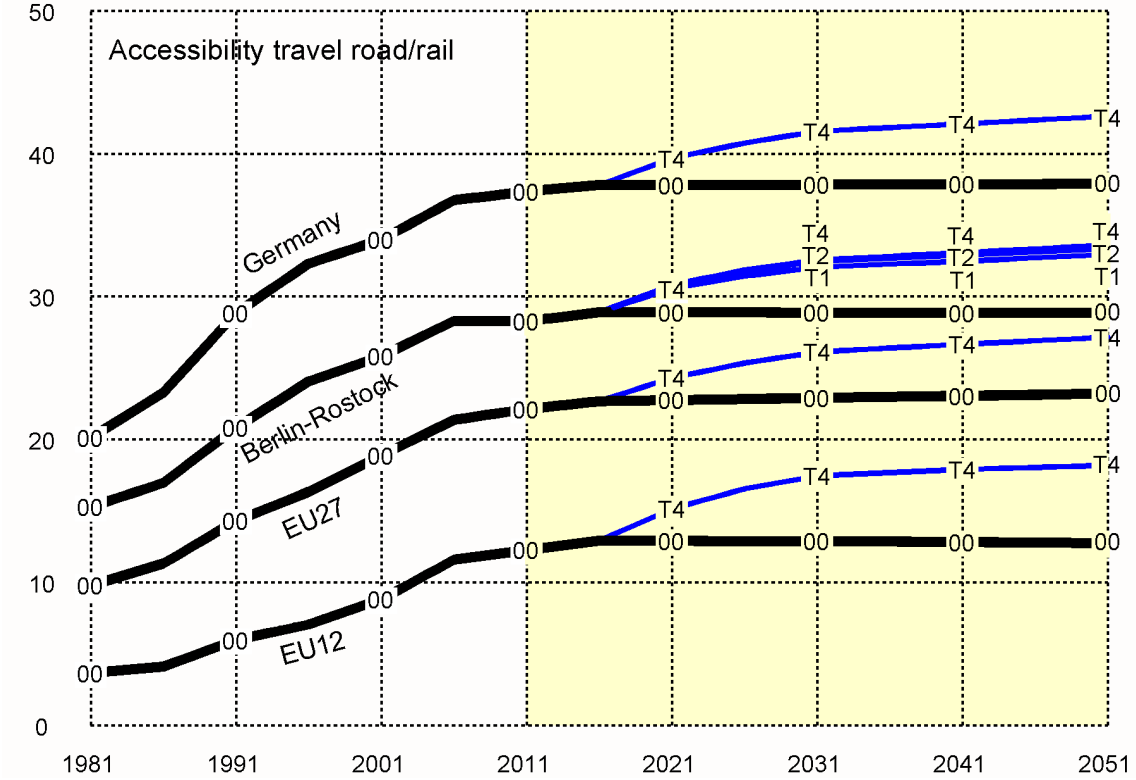


Figure 3-20: Berlin-Rostock corridor, differences in accessibility, Scenario T4 to Scenario T2, 2051

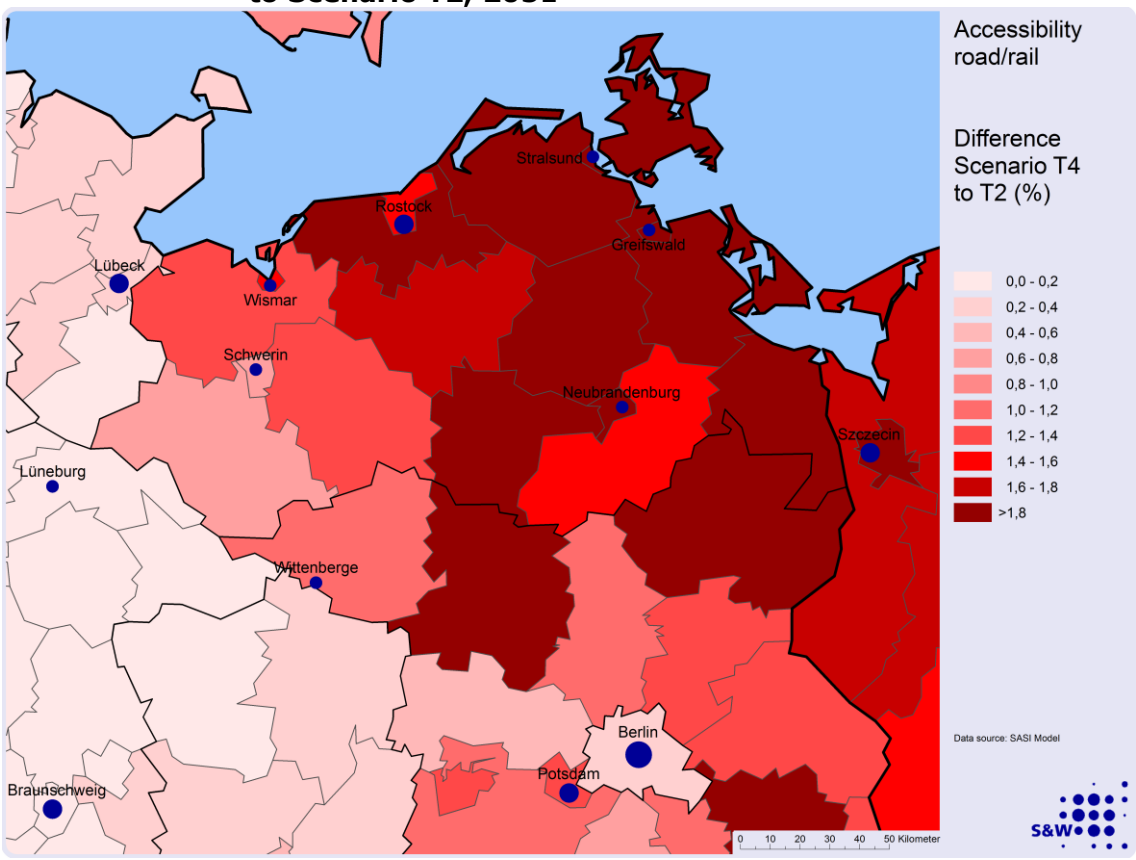


Figure 3-21: GDP per capita, Scenarios 00, T1, T2 and T4, 1981-2051

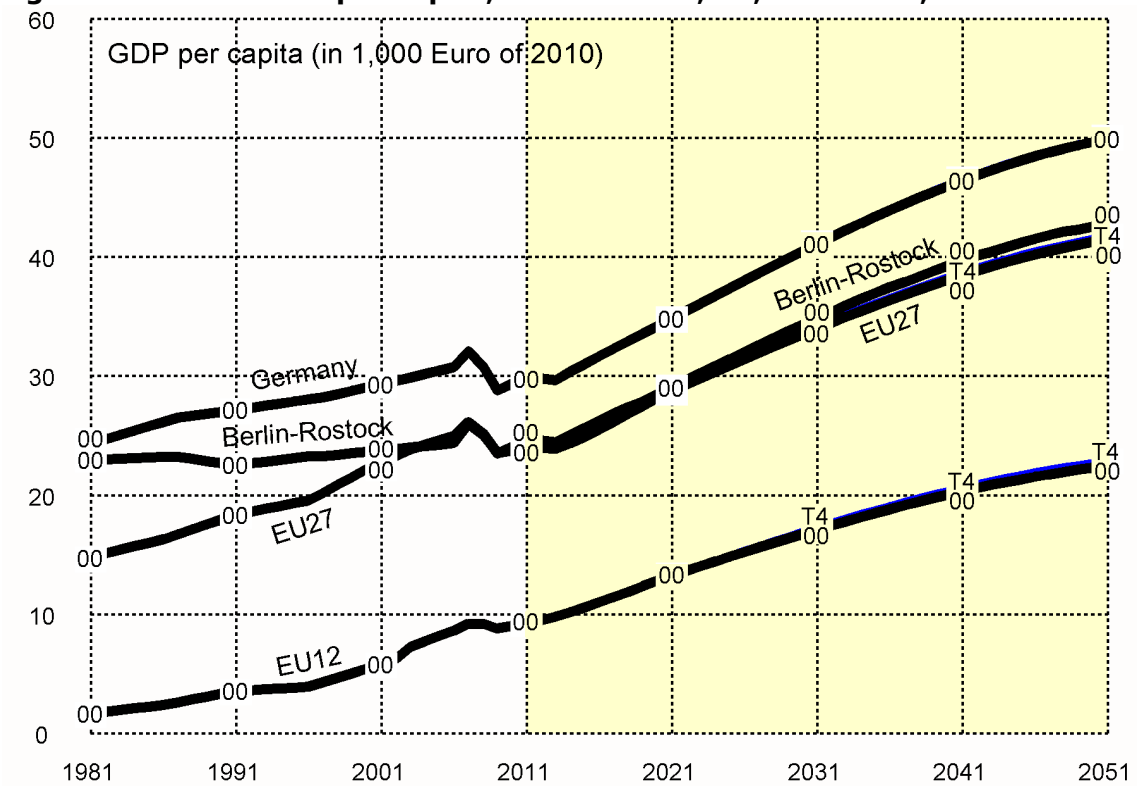


Figure 3-22: Berlin-Rostock corridor, differences in GDP, Scenario T4 to Scenario T2, 2051

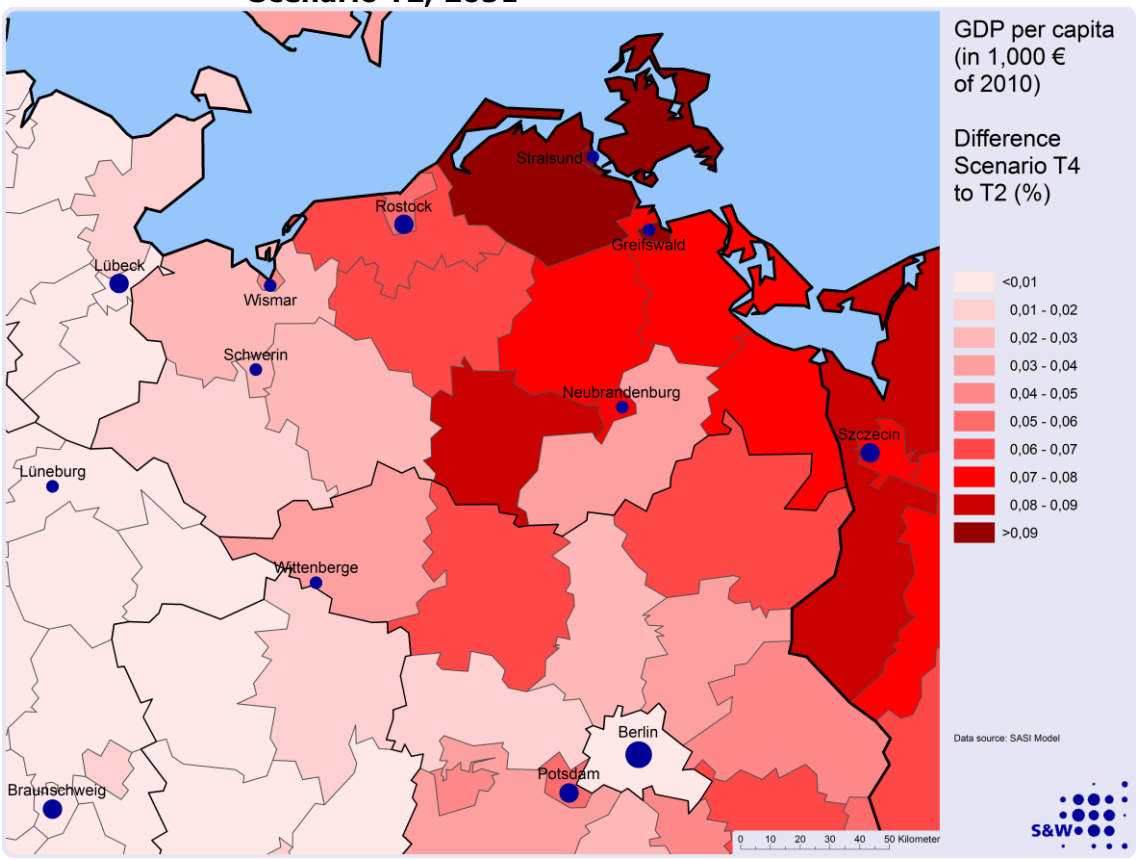


Figure 3-23: Accessibility travel, Scenarios 00, T1, T2 and T5, 1981-2051

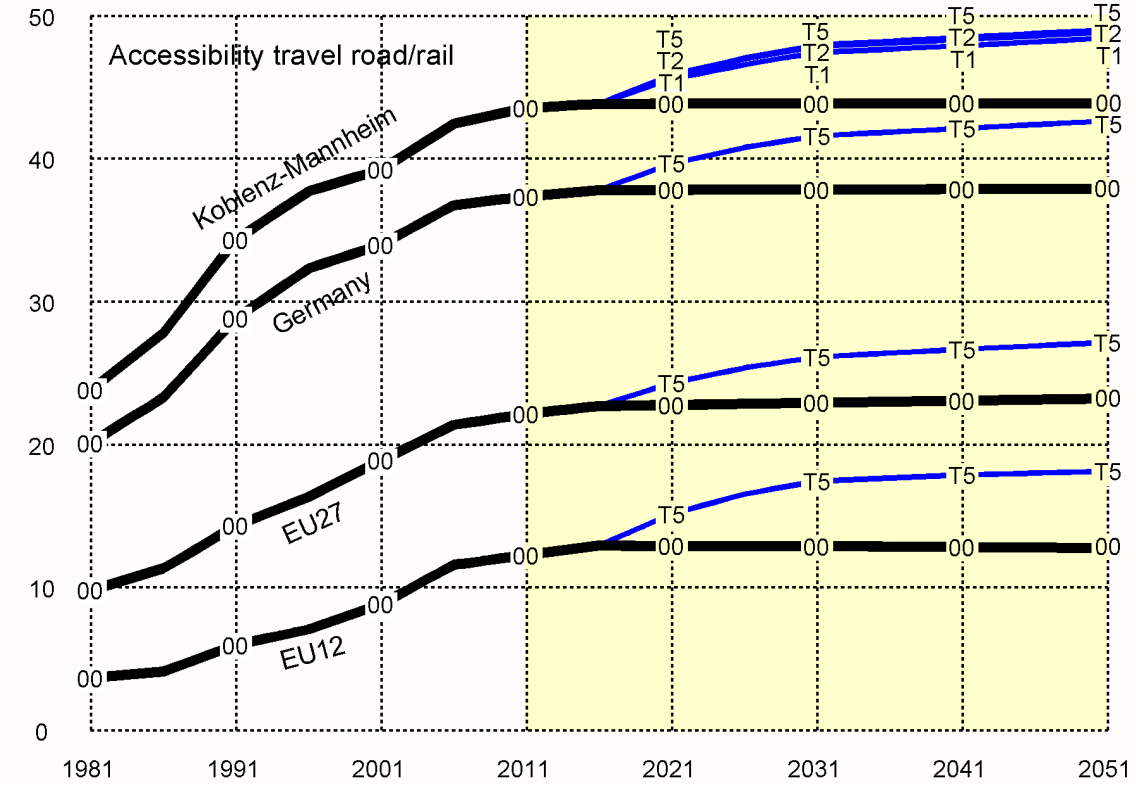


Figure 3-24: Koblenz-Mannheim corridor, differences in accessibility, Scenario T5 to Scenario T2, 2051

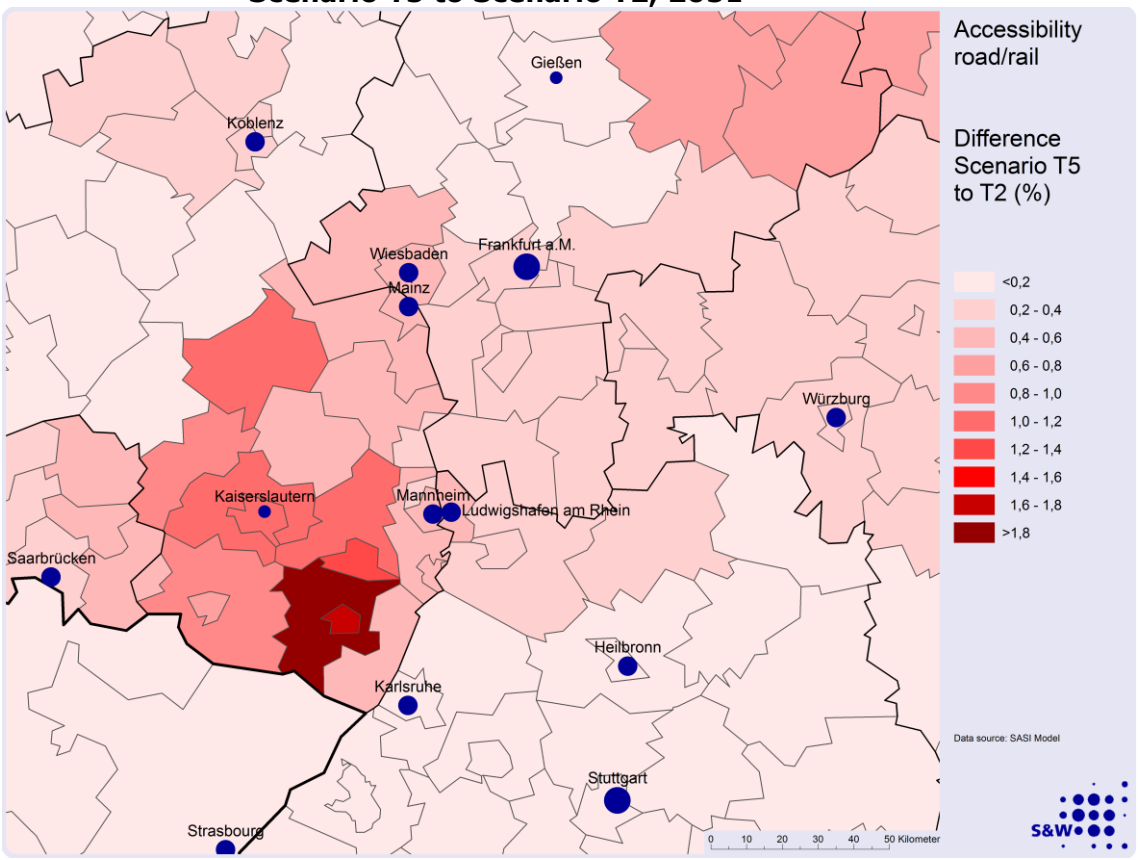


Figure 3-25: GDP per capita, Scenarios 00, T1, T2 and T5, 1981-2051

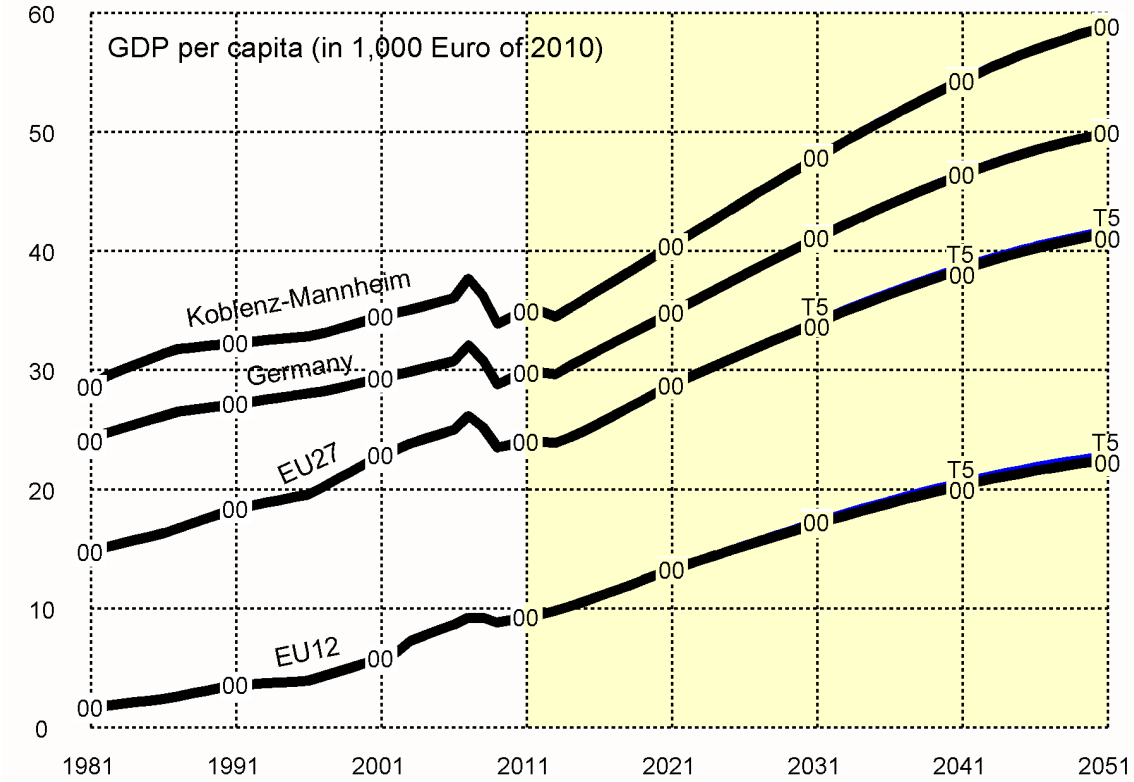
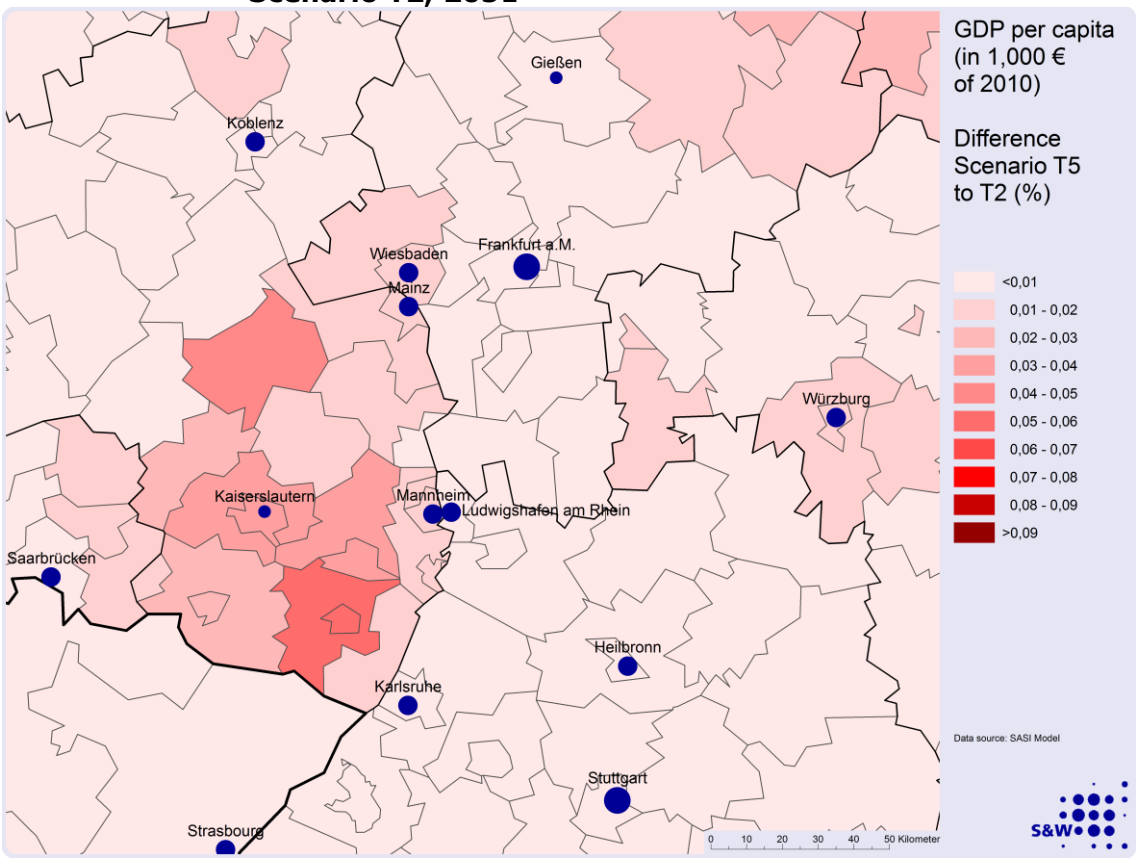


Figure 3-26: Koblenz-Mannheim corridor, differences in GDP, Scenario T5 to Scenario T2, 2051



4 International practical examples and regional approaches

One objective of this MORO study consisted in identifying different experiences that exist on international level and refer to considerations of spatial development policy in the context of further developing trans-European transport networks. This experience should be analysed as regards the transferability to selected German regions. Both the conducted analyses and the experience from the kick-off workshop and the regional workshops showed that reaching this objective is characterised by special challenges:

- As the MORO study is based upon spatial development policy considerations, mainly (but not only) examples in the field of spatial development were to be selected. The focus was to be put on approaches that aim at better linking TEN-T measures with regional transport and regional development. Due to their structure and orientation, transnational Interreg projects are especially suitable to identify good practices related to horizontal and vertical linkages between transport and spatial development policies.[26]
- Identifying good examples of transnational Interreg projects and approaches to analyse them shows that it is essential to specify the challenges for which successful examples shall be found. When having a closer look, different nuances occur that partly significantly impact the transferability of experience. This is also confirmed by scientific literature. Stead and Nadin conclude that "good practice within the practice of cross-border and transnational cooperation on spatial planning may not get beyond the level of 'illustration' and thus will not constitute 'knowledge' in the sense of a conceptual understanding of problems and solutions".[27]
- For many projects, the possibilities of processing targeted results are limited. For older projects (e.g. Interreg IIIB), homepages are not updated or do not exist anymore. Partly, not all project results are available. To obtain more detailed information, it is often necessary to approach project representatives. Against this background, the main working steps and results of the identification and analysis of successful examples are presented, and single specificities of topics, approaches, and solutions in model regions are highlighted.

[26] Cf. Zwicker-Schwarm and Gies 2012: 4
[27] Stead and Nadin 2011: 161

Transferability of good experience – an excursus

If good experience, so-called 'good practices' are shall be transferred from one territorial context to another, different questions occur as regards contextualisation:[28]

- In how far does this good experience depend on a specific institutional context?
- In how far was this good experience influenced by the geographic and socio-economic context?
- How can single elements of this good experience be interpreted and 'translated' in order to adapt them to another context?

Based on this, further questions arise as regards transferability. Going beyond contextualisation, these questions refer to transfer mechanisms and elements. Stead concludes that especially methodologies, techniques, knowledge and implementation rules have a high degree of transferability. Contrary to this, ideas, organisational settings or joint projects, for example, are not well-suited for transferring them to other regions. Furthermore, different modes and mechanisms of distribution have to be distinguished:[29]

- transfer – transferring into a new context;
- diffusion – spreading from one context to another by slow adaptation;
- convergence – processes of long-term adaptation of different starting points;
- translation – interpreting and experimenting with the initial approach;
- organisational/institutional learning – changing organisational routines.

Three dimensions result from the approach discussed in Chapter 2.2. For each *thematic field* different *fields of action* and *groups of players* can be distinguished (cf. Figure 2-1):

- **thematic field:** passenger transport – goods transport and logistics – participation and governance;
- **fields of action:** transport infrastructure – transport management – mobility management – framework conditions;
- **groups of players:** supply side – users – political level.

The practical examples were selected so that they cover different combinations of these three dimensions. In Chapter 4.1 governance structures are discussed when planning major transport infrastructure projects. In the context of the thematic field 'participation and governance', it hence focuses on transport infrastructure and creating appropriate framework conditions. It mainly addresses players from the political level, since these are the most relevant players for initiating corresponding structures of cooperation. Chapter 4.2 on the deregulation of local and regional public transport focuses on passenger traffic and considers transport management, political actors and players providing public transport. Chapter 4.3 deals with goods transport in areas remote from the corridor axis. Thus, in the thematic field of goods transport both supply side and users of logistics services are addressed and the focus is put on transport and mobility management. Finally, Chapter 4.4 focuses on overarching challengers and aims at an integrated perspective. Thereby, different thematic fields, fields of action and groups of players are considered. A summary of the classification of the subchapters is presented in the following table.

[28] Cf. Stead 2012 e.g.
[29] Cf. Stone 2012 e.g.

Table 4-1: Overview of the addressed topics related to the 'linking of transport networks'

	Thematic fields	Groups of players	Fields of action
Governance structures when planning major projects (4.1)	Participation and governance	Political level	Transport infrastructure
Deregulation of local public transport (4.2)	Passenger transport	Political level and supply side	Transport management
Goods transport remote from the corridor axis (4.3)	Goods transport and logistics	Supply side and users	Transport and mobility management
Integrated approach for the transport sector (4.4)	Various	Various	Various

4.1 Governance structures when planning major infrastructure projects

Further developing TEN-T and linking them with secondary transport networks also entail major infrastructure projects. Due to their importance for citizens and the affectedness of several regions and sector policies, such projects are suited for analysing multi-level governance structures and opportunities for public participation. So, cooperation between transport, spatial and regional development by involving different levels can be illustrated with such major projects.

Major infrastructure projects that were previously initiated and/or implemented, may hint at possible approaches for planning major projects. The development of appropriate governance structure is especially important for major infrastructure projects in cross-border regions. Appropriate examples may be the Brenner Base Tunnel and the Oresund Bridge.

In this context, players who plan major cross-border infrastructure projects face, among others, the following questions, which are relevant with regard to governance and for which experience of the above-mentioned major projects may present a useful indication:

- When should the consortium necessary for planning and implementation be established?
- When is it necessary to sign an international treaty for the project's implementation? Which preliminary work can already be carried out without a project-related international treaty?
- How should public relations be prepared? When should this be done?
- How can the population be integrated in the project? How may acceptance for the project be increased?
- Which players were when involved in designing and coordinating the processes? Which tasks does each player have?

For both exemplary projects, the following table presents a summarising overview of the information, which is most important for answering these questions.[30]

Table 4-2: Selected milestones for the projects Brenner Base Tunnel and Oresund Bridge

Brenner Base Tunnel		Oresund Bridge	
1971	First study on the new Brenner railway line with a base tunnel, initiated by UIC (International Union of Railways) Working group of rail companies created: DB, ÖBB, FS* ⇨ start of planning activities	**1970s/ 1980s**	Idea of a connection between DK & SE agreed on and dropped
1977	Mandate for project development by the government of Tyrol, including the railway companies	**1991**	Agreement between DK & SE to establish a fixed link between both countries
1980	Transport ministries of DE, AT, IT agree on need for feasibility study	**1992**	Based on the agreement, partnership agreement reached and consortium (Øresundsbro Konsortiert) established. It is owned by two companies: Danish A/S Øresund Swedish Svensk-Danska Broförbindelsen
1994	Axis Berlin-Naples becomes TEN-T priority project		
1995	Brenner Eisenbahn GmbH (ÖBB subsidiary) established		
1999	Transport ministers of AT & IT establish BBT EEIG (Brenner Base Tunnel European Economic Interest Grouping) to plan the tunnel		
2004	AT & IT sign a treaty to build the Brenner Base Tunnel; establishment of BBT SE (Brenner Base Tunnel Societas Europaea/European Company) by merging BBT EEIG	**1993**	Motorway construction started
		1994	Construction is approved by both governments

Source: Overview based on www.bbt-se.com/en/project/history/ and www.bbt-se.com/en/project/basic-data/; www.oeresund-bridge.com/facts-and-figures/history.html
* DB – Deutsche Bahn AG (German Railways), ÖBB - Österreichische Bundesbahnen (Austrian Federal Railways), FS - Ferrovie dello Stato Italiane – (Italian State Railways)

Planning and construction phases of the Brenner Base Tunnel example began after the BBT EEIG (Brenner Base Tunnel European Economic Interest Grouping) had been established. Many preliminary work steps such as feasibility studies, technical studies, beginning of the planning, and the establishment of legal basics related to railway regulations, which had not yet been adopted in Austria, were carried out prior to assigning the international treaty. Many other activities were only carried out after the treaty had been concluded, e.g.:

- establishing the Italian company, which holds the Italian share;
- establishing the Brenner Corridor Platform;

[30] A comprehensive list of the chronology of the Brenner Base Tunnel is available at www.bbt-se.com/en/project/history/.

- Memorandum of Understanding;
- shareholders' agreement and establishing the SE by merging the EEIG;
- construction on the first section of the exploratory tunnel started in 2007.

When the EEIG was established, a preliminary consortium was established to carry out preliminary work steps (project development) for building the Brenner Base Tunnel. After the treaty had been concluded, this consortium was transformed into a European Company. For building the Oresund Bridge the consortium was established only after the treaty had been concluded and close to the start of the construction works. Comparing both examples reveals that, depending on the selected legal form, the establishment of a consortium is conceivable already prior to the conclusion of the respective treaty. The involvement of the railway companies in the development of the Brenner Base Tunnel at an early stage is particularly striking.

Table 4-3: Planning and construction phases of the Brenner Base Tunnel

Planning and construction phase	Period
Phase I: Preliminary project and prospection	1999–2003
Phase II: Final project and environmental impact assessment	2003–2010
Phase IIa: Exploratory section	2007–2013
Phase III: Main tunnel	2011–2025

Source: www.bbt-se.com/en/project/basic-data/

Experience from these sample projects does not suggest any specific moment for starting public relations. The example of the Brenner Base Tunnel, however, shows that extensive information possibilities are necessary. In fact, this cannot prevent potential opposite positions[31], but it can help to design a transparent process and to discuss possible critical aspects promptly and extensively.

For the Brenner Base Tunnel, an informational website and contact points with contact persons and information points for exchanging information were established on both sides of the border. The information provided for example comprises:

- general information about the project,
- issues related to environmental protection,
- information and decisions related to transport policy,
- background information for geological questions,
- models of the tunnel construction and a video on the route,
- information about the progress.

[31] Cf. e.g. www.stop-bbt.it/news.html

The planning process for the new railway line between Dresden and Prague

Goods traffic on the railway line in the Elbe Valley implies a high strain for its inhabitants. The Elbe Valley line passes the Saxon-Czech border area and connects Dresden and Prague. A new railway line between Dresden and Prague has therefore been considered for several years both on the Czech and the Saxon side. The new railway line shall reduce goods traffic in the Elbe Valley and significantly shorten the travelling time for passenger traffic (between Dresden and Prague from more than 2 hours to about 1 hour, for example). So far, the project has been submitted for the Federal Transport Infrastructure Plan and different preliminary analyses have been carried out.

After studies for high-speed rail transport on the Dresden-Prague line had been registered as pre-identified project for the Orient/East-Med Core Network Corridor in the regulation establishing the Connecting Europe Facility[32], the Saxon Ministry for Economic Affairs, Labour and Transport (SMWA) and the Czech Ministry of Transport applied for a study on preliminary planning services for the new Dresden-Prague railway line in spring 2014. After the application had been approved in summer 2014 and the project had been commissioned in Saxony and the Czech Republic in autumn 2014, the preliminary planning study was launched. It shall be finalised by the end of 2015.

In addition to this, further preparations are made for establishing necessary governance structures. By means of a strategy document, which is conjointly elaborated by the SMWA, the Czech Ministry of Transport and the Saxon and Czech counties involved and/or affected, participation shall be achieved at local level. The counties shall participate and initiate as regards planning, communication and coordination. Besides the counties, the relevant municipalities are also invited to participate. First attempts to make contact revealed that the general interest is not evenly distributed among the counties and municipalities on both sides of the border. During the study and with support of this study, cross-border cooperation between transport and spatial planners could, however, be improved and a long-term exchange of information between the players involved and affected could be established.

Based on a 'letter of intent' signed by the responsible transport ministers in June 2014, the objective is to establish a project corporation by involving the counties. For this purpose, not only the organisational, legal and financial structure (as a European Grouping of Territorial Cooperation – EGTC, for example), but also the involvement of relevant representatives is analysed.

The efforts for coordination illustrated in this example show the relevance of different competences, especially in the case of cross-border projects with different competences at ministerial level. The development of appropriate governance structures thereby implies a special need for coordination. Early and continuous participation of regions and municipalities is to be taken into consideration. Furthermore, it has to be defined for which topics and when public participation instruments shall be used. In this context, it is essential to communicate for which topics a scope for action generally exists. This helps regions, municipalities, and citizens to formulate their requirements related to the future development of the corridor.

[32] COM(2013) 1316 2013

4.2 Deregulating local public transport to secure transport supply

By interlinking European metropolitan regions and large cities, TEN-T networks mainly favour urban agglomerations. The regional development perspective thus highlights that measures have to be taken for better connecting surrounding regions with regional centres and consequently with urban agglomerations. Especially rural-peripheral regions that are sparsely populated often face the challenge of securing public transport supply in the long run. Connecting surrounding areas with regional centres and agglomerations, however, is necessary for all population groups to have appropriate access to large-scale transport axes.

In order to reflect the challenge of securing passenger transport in rural-peripheral areas in the course of demographic change, different projects were analysed regarding possible approaches. Only a few projects finally focus on securing sustainable public transport in rural-peripheral areas. Furthermore, the examples summarised in the following show that this problem may be linked to very different components:

- **SINTROPHER.** The Interreg IV B project of the North-West Europe programme area aims at further developing the local and regional transport supply in five peripheral regions of the cooperation area. The approach shows especially relevant considerations for the **hinterland of urban areas**. By involving enterprises (public-private partnerships – PPP) that are interested in good accessibility of workplaces for their employees, new connection points for tramways and better interchanges between different transport modes were established, and bus routes were adjusted to the needs of enterprises and employees. One of these approaches is to use tram trains: "The technology allows conventional trams to run on to the mainline railway network, offering a superior service quality over conventional rail, coupled with the flexibility, service penetration and cost-effectiveness of bus-based systems" [33].
- **NWERIDE.** The Interreg IV B project of the North-West Europe programme area aims to increase the number of persons per car journey by connecting ride-sharing systems more efficiently and by involving public transport. The main objective is to make car journeys to and/or from public transport access points more efficient by using car sharing/lifts. To this end, a platform providing real-time information on lifts and public transport systems is currently developed.
- **Taxibus.** The project was carried out in the context of LEADER in the association of local authorities Montana dell'Oltrepò Pavese in the region of Lombardy to improve the quality of life in rural areas. It developed a network of integrated rural transport services. The project aimed to secure and develop sustainable transport options, respectively, in a rural region with an ageing and shrinking population. It should increase the regional quality of life for non-motorised inhabitants by easing their access to medical services or cultural sites. Based on this pilot action, the network could be expanded to the whole region and it was possible to show that the developed transport

[33] www.sintropher.eu/sites/default/files/images/editors/downloads/Sintropher_brochure_-_English.pdf

network is operable and can be run permanently. No further details are available on the funding and continuation after project completion.

All components are closely related to restructuring and deregulating local public transport by introducing alternative modes of public transport. Thus, the following Figure 4-1 presents an overview of characteristics of certain modes of public transport in order to unravel the term diversity existing in the field.

Figure 4-1: Main characteristics of selected flexible modes of public transport

	On-demand route taxi	Citizens' bus	Hailed/on-demand share taxi	On-demand bus
Type of service	On-demand route	Fixed route	Demand responsive route	Whole area
Access points	Stop	Stop	Stop	At one's doorstep
Exit points	Stop	Stop	At one's doorstep	At one's doorstep
Schedule	Yes	Yes	Yes	Yes
Seat guarantee	Yes	No	Yes	Yes
Route	Inflexible	Inflexible	Flexible	Very flexible
Disposition	None	None	Offline	Online
Notification	Yes	No	Yes	Yes
Spatial coverage	Low	Low	Medium	Complete
Type of vehicle	Taxi / minibus	Minibus	Taxi / minibus	Taxi / minibus
Spatial adequacy	Local	Local	Local	Local / regional
Tariff	Regular tariff	Special tariff	Regular tariff + additional fee	Regular tariff + additional fee

Source: translation based on Vetter and Haase 2008: 6

The terms of this theoretical distinction are not consistently used in practice.[34] Comparing the overview in Figure 4-1 and the modes of public transport analysed for the Mecklenburg Lake District shows that the analysed fixed schedule service corresponds to the on-demand route taxi, the territorially flexible service is related to the on-demand/hailed share taxi and the fully flexible service is similar to the on-demand bus. The alternative of a citizens' bus was not taken into consideration for the Mecklenburg Lake District. In addition, further modes of public transport can be distinguished according to their degree of territorial and temporal flexibility. Figure 4-2 presents a systematic overview of this.

[34] The original German terms were analogously translated, the diversity of terms used is apparent both in German and English.

Implementation plan for the use of flexible modes of public transport

In an analysis for the Mecklenburg Lake District on flexible modes of public transport three approaches were compared:

- **Service with a fixed schedule.** The service follows a fixed route from stopping point to stopping point and has a fixed timetable. The vehicle only stops at stopping points when passengers notified the use of the service or want to get off. Potential savings result from optimising the use of vehicle capacities and cancelling tours for which nobody registered. Coordination efforts are lower than for more flexible modes of public transport.
- **Territorially flexible service.** In this case, predefined stopping points of a basic route (usually connection points, hubs) are combined with additional stopping points that are only served when passengers requested to board or get off.
- **Fully flexible service.** The transportation is usually provided by means of minibuses that transport passengers with the same final destination. It is possible to board and get off at stopping points and predefined places, respectively. Approximate timetables are scheduled, for which passengers can register at the mobility centre. This entails comparatively high efforts for disposing the service, i.a. because the route has to be planned.

Flexible transport services shall secure the provision of services of general interest in the area of local public transport access considering the economic viability of the service. Two crucial objectives were simultaneously considered.[35] On the one hand, traditional scheduled services should be strengthened along the main transport axes. On the other hand, potentials for flexible services, that cover sparsely populated areas and times with low public transport demand, respectively, should be identified and realistically assessed.

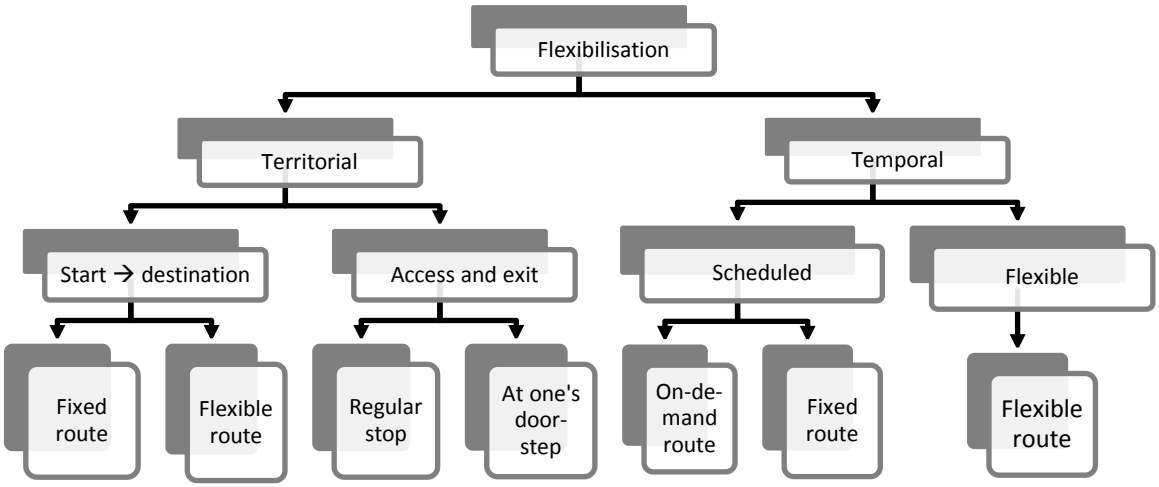
For registering the passengers' reservations, different organisational structures[36] are assessed in the analysis:[37]

- **Maintaining the status quo.** A reservation is made via different transport operators. No additional costs result from this structure, but it is rather complicated and not customer-friendly.
- **Establishing a central registration office at the mobility centre of the transportation company Mecklenburg-Strelitz (VMS).** So far, the existing mobility centre is responsible for timetable and tariff information and ticketing and is open from Monday to Friday between 6 a.m. and 6 p.m. Increasing the range of services and opening hours would imply additional costs for both establishing and operating the service.
- **Establishing a central registration office at an external service provider.** In this case, hitherto existing service solutions provided by specialised service providers could be used. Additional costs would emerge but cannot yet be calculated precisely. Under due consideration of costs and services, notwithstanding, it is recommended to realise this alternative.

The analysis for the Mecklenburg Lake District concludes that increasing the flexibility of the supply (if necessary, by the use of subcontractors) may be more efficient than conventional services and therefore contributes to cost savings.[38]

[35] Cf. Planungsbüro für Verkehr 2012: 3
[36] In the following section only those alternative organisational structures are discussed that do not only focus on the organisation of urban traffic in Neubrandenburg.
[37] Cf. Planungsbüro für Verkehr 2012: 21f.
[38] Cf. Planungsbüro für Verkehr 2012: 30

Figure 4-2: Possibilities to make public transport more flexible



Source: translation based on BMVBS (ed.) 2009: 26

The following considerations show how different approaches for identifying appropriate modes of flexible public transport may lead to different conclusions.

The development of flexible modes of public transport in the Mecklenburg Lake District was based on the assumption that the services shall be provided by professional bus and taxi companies, respectively. The use of independent alternatives such as a citizens' bus or taxis for special events was not taken into consideration for the development and assessment of flexible modes due to lacking possibilities to integrate them systematically in the existing network structure.[39] Pupils and inhabitants of rural areas who want to get to the nearest central location were identified as potential users of the transport services. Commuter traffic was considered as a target group that is mainly relevant for urban traffic and tourists as another potential target group with a low demand so far. Due to the framework conditions (population density, expected number of passengers, financial situation of public budgets) a service with a fixed timetable was generally recommended for the Mecklenburg Lake District.[40] In some areas of the county like the city of Neubrandenburg, for example, it should be complemented by additional services.[41]

Other regions were also dealing with different aspects of increasing the flexibility of local and regional public transport. A study for the Saalekreis, for example, concludes that besides the on-demand/hailed share taxi also the on-demand bus most closely matches the framework conditions of rural regions because this alternative has a good potential to improve local public transport. This may allow for a combination of conventional and flexible services, within which the latter may increase the density of conventional services, complement or even replace

[39] Cf. Planungsbüro für Verkehr 2012: 10
[40] Cf. Planungsbüro für Verkehr 2012: 12
[41] Cf. ibid.: 17ff.

them.[42] In a handbook on flexible modes of local public transport, the set of selection criteria[43] serving to assess the adequacy of different services leads to the conclusion that the use of on-demand buses, which allow complete spatial coverage on a flexible route with a demand-oriented service, is deemed to be best suited for offering attractive and demand-oriented services under the conditions found in the Mecklenburg Lake District.[44]

4.3 Goods transport remote from the corridor axis

In order to assess the utilisation of potentials of railbound goods transport in areas distant from the corridor axis, different projects were analysed regarding possible approaches. Only a few projects finally focus on this specific topic in rural-peripheral areas. Furthermore, the examples[45] summarised in the following show that this problem may be characterised by different components:

- **BatCo.** The project BatCo of the Central Europe programme area aimed to further develop the Baltic-Adriatic transport axis in a sustainable and coordinated way, and thus to promote the modal shift from road to rail. From the perspective of this MORO study one particular approach is of special interest – the improvement of the availability of information for enterprises.
  In order to improve the information for enterprises that transport goods transnationally, a network of so-called Transnational Business Cooperation Points was established along the axis. These cooperation points are located in institutions that have direct contact with the respective regional enterprises. Some cooperation points are located in regional development agencies or in chambers of industry and commerce, for example, and support enterprises in developing solutions for transnational transport and logistics issues.
  So far no information is available in how far these cooperation and contact points are used for an improved use of available transport and logistics options. This approach, nevertheless, illustrates additional opportunities to involve intermediaries for making information on transport alternatives available for enterprises.
- **CASTLE.** This interregional Interreg project aimed to improve logistics policies of SMEs and thus addressed enterprises even more directly than the BatCo project, for example. Thereby, CASTLE is the acronym for "Cooperation Among SMEs Toward Logistic Excellence". By publishing 'best practices' the project provides an overview of a range of successful approaches related to topics such as
  - strengthening offered logistics services and the logistics industry;
  - improving the demand for logistics services by enterprises;
  - improving training in the logistics sector;
  - consolidating institutional and governance structures in the logistics sector.

[42] Cf. Vetter and Haase 2008: 5
[43] Different characteristics (such as size of the serviced area, potential density according to population density and settlement structure) are combined. Accordingly, the Mecklenburg Lake District is to be classified as a large serviced area with low population density and disperse settlement structure.
[44] Cf. BMVBS 2009: 36
[45] The analysis of further examples such as Transitects or AlpFrail, for example, did not reveal further aspects that might be of interest for working with the model regions.

Decision-makers in the logistics sector shall be supported with the compilation of successful and tested approaches, which shall provide the basis for further improving logistics structures.

Goods traffic distant from the corridor axis may aim at both reducing the burden on transport infrastructures of the primary axes and better connecting local enterprises and integrating the chains of economic value added along a corridor. Correspondingly, quite different starting points exist for promoting the development of rail transport within a corridor but also in areas that are located in proximity to a TEN-T axis.

Actions required to maintain a railway line

The HUB 53/12° example highlights the tasks to be tackled and the challenges to be overcome if maintaining and using a railway line between corridor axes require cross-national, i.e. interregional coordination. The potential for further development, which in the region consists in reorganising traffic in the hinterland of the Baltic seaports, and refining products of transit traffic before they are further transported, has not yet been materialised. Maintaining a railway line requires different starting points:

- To analyse the relevance of the status quo (i.e. on-going operation on the railway line) is essential for the assessment of maintaining the railway line.
- It might not only be necessary to consider economic efficiency objectives but also the provision of services of general interest.
- For analysing the potentials of the railway line, passenger and goods transport are analysed from an integrated perspective.
- For distributing goods in the hinterland of Baltic seaports, different transport modes should be used as effectively as possible.
- Considering the provision of additional services may improve the economic efficiency of the railway line. An example for such an approach is the Wustermark rail freight terminal.[46]
- In order to achieve the initial objective of shifting regional goods traffic from road to rail, a 'caretaker', which is employed for a certain period, could establish contacts between network operators, logistics companies and regional enterprises, and develop strategies for a modal shift.
- Due to different structures in Mecklenburg-West Pomerania and Brandenburg, communication barriers related to the coordination of orders of the railway lines have to be overcome.

The example illustrates that the necessity to coordinate local requirements is more diverse from a regional and local perspective than what is visible from higher-level perspectives. This refers to both the formulation of objectives and different interests of the players involved. In order to cope with these challenges, a strategy shall be developed in the context of a cross-national regional conference stepwise extending the range of players. In the context of this MORO study, first steps were undertaken in cooperation with HUB 53/12° representatives by discussing (i.a.) the above-mentioned starting points at a preparatory workshop.

[46] Cf. Bauer 2014

The results of the CASTLE project also highlight some challenges identified by the HUB 53/12° and point out exemplary solutions:[47]

- The approach of a 'caretaker' was implemented in the Region Emilia-Romagna by establishing a 'logistics broker'. The Logistics Broker Initiative aimed to optimise goods traffic. By means of cooperation of the transport management of manufacturing SMEs, transportation costs are reduced and less kilometres are driven by lorries. Another approach to increase the demand for logistics services was initiated in this region by means of an initiative of conjoint planning and purchase of logistics services by SMEs. This was implemented after having conducted a feasibility study and a pilot period with pilot companies. Both test phases were implemented by means of Interreg IIIB projects.
- A similar approach was implemented by the work group 'goods mobility' in the Stuttgart Region. The work group is organised by 'KLOK Kooperationszentrum Logistik e.V.' (Logistics Cooperation Centre), and deals with all problems related to transport logistics in Baden-Württemberg that require integrated solutions. The initiative aims to bring together key players, to identify crucial questions in the field of goods mobility and to exchange facts and concerns, for example.
- The objectives pursued by revitalising rail goods transport in the Wielkopolska voivodship are similar to those of the HUB 53/12°. For revitalisation, single goods traffics were selected for a modal shift and a cooperation programme between municipal representatives, logistics providers and rail operators was developed.

The reutilisation, privatisation and refurbishment of the Wustermark marshalling yard[48], in addition to previously presented examples, shows starting points for broadening the range of services that also contribute to operating railway lines more efficiently that may otherwise be closed. In Wustermark, it is possible

- to park, compose, unload, move and reorganise goods trains,
- to park wagons, track building machines, locomotives etc.,
- to fill up working materials,
- to mend trains,
- to handle and tranship goods and
- to use social services provided for the staff.

Due to the versatility of offers, the 'Rail & Logistik Center Wustermark' is also suitable as a transhipment point for seaport hinterland traffic. In this way, capacity constraints of the North Sea ports may be absorbed from the rail side.

4.4 An integrated approach for the transport sector – and beyond

Stand-alone considerations in the transport sector often lead to difficulties that may go beyond the transport sector. They bear on the integration of regional transport, economic and settlement development, for example, and related

[47] Cf. CASTLE 2009
[48] Cf. Bauer 2014

planning processes on the regional level respectively. This, furthermore, refers to interregional and transnational transport flows and their consideration for national transport policies. The following examples cover different aspects of this consideration:

- **TransBaltic.** The Interreg IV B project conducted in the Baltic Sea Region from 2009 to 2012 aimed to support transport companies and logistics service providers in structuring their transportation routes in terms of a multimodal transport system for goods traffic in the Baltic Sea Region. By providing information for identifying and suggesting transport chains, companies shall be enabled to change their logistics chains more easily. LOGIT4SEE is a specific tool for decision-making. Available information from logistics service providers is entered in the tool, which is necessary for calculating and comparing transportation times and costs for different transportation chains. In this way, the user is enabled to select the most reasonable transport alternative. Besides planning-related components, the tool contains components that can be used for executing transports, for example to monitor goods.
- **RAILHUC.** The Interreg IV B project of the Central Europe programme focussed on the promotion of interconnectivity and accessibility by integrating railway hubs. The approach comprises interfaces between the trans-European network and regional and local passenger rail transport and non-rail-bound transport systems. In the sense of integrated transport management, the project focussed on the fact that the extension of high-speed rail tracks requires an integration of all transport modes and levels. By means of instruments for public participation, such as public forums or experts' meetings, specific administrative, infrastructure and maintenance measures shall be identified. By prioritising measures in a strategic plan and considering e.g. political framework conditions, the future integration of urban nodes shall be promoted.
- **TransGovernance.** The Interreg IV B project which was also conducted in the Baltic Sea Region dealt with the challenges that occur for the coordination of transport policies and management when dealing with transnational traffic flows. Four territorial levels were paramount: the macro-level comprising the Baltic Sea Region as such, the meso-level focussing on border sections, the corridor level corresponding to multimodal transnational corridors and the micro-level dealing with intermodal logistics platforms. Approaches and strategic instruments, that shall illustrate how the cooperation of public and private actors from different territorial levels can be shaped, were developed in case studies for all territorial levels.

Whereas these projects deal with the interfaces of the transport network and interregional and transnational transport development, respectively, the practice of regional planning often faces the challenge that different players have competences for closely related fields such as settlement and transport planning. In the field of transport passenger traffic is often separated from goods traffic. Consequently, it is necessary to consider different players and their interest for an integrated approach with regard to rail transport. Even though ideas for integrating different transport modes or integrating settlement and transport planning may be developed at regional level, regional associations often lack the legal basis to implement these ideas.

Regional impacts of large-scale transport development

An integrated approach beyond the transport sector that reflects the interaction between transport and settlement development, for example, requires a comprehensive information basis on regional impacts of the extension of trans-European transport networks on route sections and settlements. For the Middle Rhine-Main-Neckar model region, the early assessment of local and regional impacts was identified as a main challenge. It is expected that several route sections will face congestion even though new railway lines are built. Thus, the question arises how to deal with further increases of the volume of traffic. Territorially relevant effects of modal shifts also have to be considered here. Instruments of urban land-use and regional planning may be used to promote regional potentials and to manage the development. They, however, depend on reliable information and assessments with regard to expected impacts. In the field of settlement development it is not clear from the beginning, for example, whether the extension of the corridor will entail a concentration in metropolitan areas or rather favour settlement development in the open countryside.

The Middle Rhine-Main-Neckar model region furthermore illustrates how diverse the tasks of regional players may be. The Regional Authority FrankfurtRheinMain is mainly responsible for the regional land use plan and the landscape plan for the Frankfurt/Rhine-Main metropolitan area. The Rhine-Neckar Regional Association comprises three federal states: Hesse, Rhineland-Palatinate, and Baden-Württemberg. Its main task is to develop the regional plan for its territory. The Upper Middle Rhine Valley World Heritage Association, on the other side, is not responsible for regional planning – it mainly focuses on preserving the cultural landscape, securing and developing open spaces of regional importance and promoting tourism. None of the three mentioned subregions of the model region has instruments at their disposal that are related to spatial planning with binding force as regards an integrated approach for different transport modes or settlement and traffic planning. Thus, mainly informal approaches are used in order to contribute to corridor development. These approaches range from regional work groups (e.g. 'ICE-Forum') to transnational projects such as CODE24. The CODE24 project furthermore aimed to formalise its cooperation structure by founding a European Grouping for Territorial Cooperation (EGTC), which succeeded in April 2015. Such a body has an own legal personality and carries out different tasks, which are defined in its statutes.[49] Such a transnational grouping of authorities and other public players offers new opportunities for cooperation and shall increase the visibility of the initiative.

Management potentials for an integrated approach for regional planning authorities also exist in the field of goods transport. For example, regional planning authorities and federal state planning authorities together can identify preferred locations for the logistics sector. However, according to Langhagen-Rohrbach[50] neither regional nor federal state planning are currently prepared for an increasing demand for space from the logistics sector. Logistics is not taken into consideration in many regional plans – despite its high territorial relevance (goods transport, employment and environmental impacts) and general suitability of planning instruments for an integrated approach. Langhagen-Rohrbach i.a. identifies the regional land-use plan of the Frankfurt Rhine-Main agglomeration area as a good governance approach. This plan defines locations for the logistics sector depending on their intermodal accessibility and the existing available space. Based on this, more detailed considerations can be

[49] For further information on EGTC, cf. Regulation (EC) No 1082/2006 (2006) and Regulation (EU) No 1302/2013 (2013).
[50] Langhagen-Rohrbach 2012: 226

carried out and potentialities for extending existing and developing new logistics locations can be identified.

One possibility for optimal governance is the development of regional location concepts for logistics by the planning regions. Langhagen-Rohrbach lists eleven framework conditions that have to be considered for developing and implementing a regional location concept for logistics:[51]

- A direct link to the long distance road network is absolutely necessary. Rail access can play a supplementary role.
- Connection to the superior road network should be enabled without traffic having to pass through towns.
- The supply of space should be aligned to market requirements, which distinguish between a logistics park and a site for distribution logistics, for example.
- The area size depends on the main local type of logistics as the local market is the key to success. The only exception are locations of supraregional importance.
- Priority shall be given to the development of existing sites rather than to the development of new spaces. Centrally located conversion areas ensure the proximity to clients and short transport distances.
- The labour force potential has to be taken into consideration. If new demand for labour cannot be satisfied within the region, logistics spaces should not be defined.
- A modal shift from road to rail should only be realised after having accurately analysed the suitability of related traffic flows.
- Intermodal connecting points such as inland ports should be preserved and converting these locations should be impeded by planning instruments.
- The effectiveness of regional planning specifications can be restricted through urban land-use planning specifications. Possible locations should be open toward the logistics sector.
- In order to counteract a strong dependency, the regional economic structure should not exclusively focus on the logistics sector.

Approaches for interlinking regional and corridor development

An approach, that refers to both different corridors and the regional level that may thus be considered as an example for a horizontally and vertically integrated approach for the development of core network corridors, exists in the capital region of Berlin-Brandenburg. A TEN-T node conference is envisaged for autumn 2015. In line with the multilevel governance approach, it shall be a platform for all public and private stakeholders involved and form the basis for establishing a regional corridor and nodes work group. By bringing together results from different levels, from the European to the transnational and regional level, different relevant opportunities and challenges shall be identified. Based on the region's function as a node for three corridors, a particular need for coordinating different topics related to TEN-T development exists. This includes sustainable transport or innovative logistics concepts, for example.

[51] Cf. Langhagen-Rohrbach 2012: 226f.

For an integrated consideration of goods transport, not only traffic experts and public authorities but also stakeholders from the regional economy have to be included. Bringing together enterprises, operators of infrastructures, and logistics companies, correspondingly, is a main challenge for the members of the HUB 53/12°. Together, it can be identified which needs exist on the side of the enterprises and which requirements have to be fulfilled in order to convince the enterprises to reorganise their logistics chains. In this way, individual services may be offered and information can be purposefully prepared. First, however, it has to be clarified which enterprises and industries are mainly interested in reorganising their transport chains and for which enterprises and industries further reorganisation potentials may be identified and developed. The point is to establish a central contact person for the enterprises and to use already existing structures.

5 Conclusions

The analyses of the German model regions show that challenges and possible approaches depend on the territorial context. The model regions analysed can be categorised according to different types of regions and topics as it is shown in the following overview (Table 5-1). There are several challenges and topics that are usually to be tackled by regional stakeholders independently of their specific territorial context. Among these is the utilisation of potentialities that result from changes in accessibility and economic development due to infrastructure measures.

It can be concluded that TEN-T significantly impact on the development of German regions. How these impacts have to be taken into consideration mainly depends on the type of region, as it is described below. On the one hand, most of the TEN-T are already completed in Germany. On the other hand, significant impacts are expected from infrastructure projects that are under construction and planned in the corresponding regions. Further enhancing the TEN-T will positively impact on economic development especially in East Germany. Furthermore, in all regions complementing regional measures have a lower impact than the EU-wide enhancement of TEN-T. Regional measures aiming at increasing regional accessibility have higher impacts than single projects, yet they certainly imply higher costs as well. This, however, has not been analysed for this study. Single regional measures that are implemented in regions with high accessibility and economic strength also entail impacts on the respective areas' accessibility and economic development. Their total impact on the corridor, however, is comparatively low.

Regional differences can be identified for more specific challenges. Densely populated areas often focus on the promotion of additional creation of value added and economic growth, whereas it is considered as a means of creating a critical mass for existing enterprises in rural regions, i.e. as a locational factor. Another objective refers to maintaining the attractiveness of rural regions as settlement and economic areas in order to counteract out-migration.

Cooperation in TEN-T corridors is important for many regions that are located between the metropolitan areas for exploiting their regional potentials and counteracting the on-going concentration trend in metropolitan areas. This is valid for both densely and sparsely populated regions. Thus, it shall become a matter of course taking all transport modes into account when carrying out planning activities. 'Regional corridor platforms' could be a suitable instrument for a corresponding local or regional cooperation structure.

Although not all subjects could be explored in depth for this MORO study, they point out further starting points and needs for cooperation between spatial and transport development. Local and regional stakeholders currently work on some of these topics, by commissioning local and regional studies that address single specific topics. In a study commissioned by the Mecklenburg Lake District different alternative features for flexible local public transport services were analysed, e.g. with respect to registration periods and offices. In the context of the analyses for the new railway line between Dresden and Prague, the impacts

on travel times for commuters between Ustí and Dresden were calculated. As results for these questions are already available, they were not explored in more detail in the course of this MORO study but are taken into consideration in Chapter 4.

Table 5-1: Exemplary topics for linkages between transport and spatial development according to the type of region

Model region	Type of region	Exemplary main topics
Dresden Region	Central city & urbanised surrounding area	Dealing with bottlenecks of the Elbe Valley line; involving regions and municipalities in planning processes; instruments for citizen participation
Mecklenburg Lake District	Rural area	Different organisations of flexible modes of transport; strengthening scheduled services on the main axes; realistic options for low demand
HUB 53/12°	Rural area & rural surrounding area	Maintaining rail network infrastructure; using infrastructure for modal shifts; communication between enterprises, infrastructure operators and logistics providers; need for reorganising logistics services
Middle Rhine-Main-Neckar	Central cities & urbanised surrounding area	Tendency toward concentration in metropolitan areas; intermodal considerations; dealing with congestion; improving local public transport services

The regions are also aware of other topics but to deepen them is planned for a later stage or not yet planned at all. Constellations of players that can make the envisaged cooperation more difficult and personnel resources at the administrations involved matter in this context. Examples can, inter alia, be identified for the HUB 53/12°, for which previous studies also point out some approaches that have, however, not yet been implemented. Among these approaches is the question which specific contributions could be made by the rail infrastructure towards distributing goods to southeast Europe and increasing the storage capacity in order to achieve shorter response times. Another topic that has not yet been explored refers to identifying and developing possibilities to establish a contact person for enterprises who may act as a mediator between infrastructure operators, logistics providers, and local enterprises.

Table 5-2 summarises some examples for systematising the linkages between transport and spatial development. Comparing the allocation of single topics underlines that these examples often only cover parts of a central issue in one or another region, as discussed in Chapter 4. The real issues often comprise several dimensions as regards the linking of transport networks, i.e. different fields of action or groups of players, for example. This demonstrates the necessary and, hence, often challenging complexity of topics that are to be addressed in the field of 'linking transport networks'.

Table 5-2: Exemplary systematisation of linkages between transport and spatial development

<table>
<tr><td></td><td></td><td colspan="3">Groups of players</td></tr>
<tr><td></td><td></td><td>Supply side</td><td>Users</td><td>Political level</td></tr>
<tr><td rowspan="4">Fields of action</td><td>Transport infra-structure</td><td></td><td>Transparent public participation and consideration of interests of users when planning a transport infrastructure</td><td>Establishing cross-border cooperation and coordination for involving the public in order to create a transparent process for the planning phase</td></tr>
<tr><td>Transport manage-ment</td><td>Integration of local public transport by integrating regional train and tram schedules across different transport associations</td><td rowspan="2">A ‘caretaker’ mediates between interests of enterprises and providers of logistics services for enhancing a cost-efficient modal shift of goods transports by rail</td><td rowspan="2">Establishing multilevel governance structures when different responsibilities exist in order to establish cross-national transport management</td></tr>
<tr><td>Mobility manage-ment</td><td rowspan="2">Preserving services of general interest by developing flexible transport services considering economic efficiency</td></tr>
<tr><td>Framework conditions</td><td>Communication of needs to deregulate minimum standards in order to preserve services of general interest in rural peripheral areas</td><td>Reorganising transport by coordinating infrastructure operators, logistics providers, and enterprises</td><td>Preserving logistics areas by means of the instruments of urban land-use and regional planning</td></tr>
</table>

Potentials for regional development exist if spatial development policy directly contributes to improving the linkages in the transport sector or develops approaches for action that are based upon this. For the thematic fields of ‘passenger transport’, ‘goods transport & logistics’, and ‘participation & governance’, three exemplary approaches were selected from working in and with the model regions. Their complexity is shortly presented on the basis of the discussions that were conducted at regional workshops with the stakeholders from the model regions. The following paragraphs shall exemplarily illustrate which aspects were discussed for the related thematic field in the model region. This may refer to challenges, implications, and possible links to approaches for action. In general, all aspects have already been mentioned in Chapter 4 but are further developed or complemented.

- It becomes clear that coordinating the schedules of different local public transport associations may contribute to filling existing gaps in public

transport and at the same time open potentials for existing and future settlement areas. Mutual interactions with trans-European transport networks and with long-distance passenger and goods transport have to be taken into consideration. Conflicts can also arise in the context of integrated schedules at federal state or national level.

- When reorganising goods transport in hinterland areas of ports, an added value for the affected region must be created. The regional economic structure should hence be considered, because it may entail potentials for further processing and refining goods. At the same time, a higher utilisation of routes by goods traffic may also contribute to maintaining rail infrastructures for passenger traffic, for example. This implies another added value for the region as regards the provision of services of general interest and the linkage to regional and supraregional centres. A 'caretaker' may identify and develop potentials for increasing the use of rail infrastructures. The 'caretaker' thereby relies on the regional economy's willingness to reorganise its logistics chains. Its interest may be aroused by cost-saving potentials and high reliability offered by the new logistics services.
- In the field of participation and governance, cross-border cooperation and coordination can be identified as a soft measure in the field of physical transport infrastructures. Here, the focus is on identifying the processes for which participatory approaches shall be used. Both the counties and municipalities concerned and players in the field of transport and spatial planning have to be involved. On both sides of the border, the responsible players have to be identified, addressed, and convinced to participate, i.e. to be convinced of the usefulness of the developed approach. For this purpose it is necessary to get full support in both countries from different levels. This includes the responsible ministries and political players of different levels, especially those at regional and local level incl. citizens. After having successfully initiated the cooperation, approaches like the creation of a project corporation or regular forums are possible starting points for consolidating the cooperation in the medium to long term.

Identifying, selecting, and analysing international practical examples aimed to identify examples of successfully linking trans-European and regional transport networks that might be of interest for German model regions. Although at first glance a number of international experiences exist in the field of the main topic of 'linking transport networks and spatial development', a more detailed analysis shows that the regional stakeholders concerned often cannot directly recognise the benefit of these international experiences because the specific questions differ between the model regions and the international practical examples. This leads to the following further conclusions for using international experience:

- International experiences should not be analysed in the context of the full project. It is more useful to analyse single aspects and to use them to develop ideas or as eye openers that enable new perspectives (for developing flexible transport services by involving logistics services, for example).
- Using this experience and, not least, using the experience of transnational cooperation often becomes more difficult due to limited and inaccessible documentation. A lot of information is not fully and adequately available and consequently does neither allow to get a final overview about how to use the information nor to derive straightforward approaches.

- In order to use international experience it is often necessary to directly address the respective project members (if they still hold the same job position). This generally requires extensive personnel resources and thus is an additional obstacle for perfectly adapting international experience to the regional framework conditions.

Finally, it is important to emphasise that various topics have to be taken into consideration in the thematic field of 'linking transport networks and spatial development'. These topics cannot be analysed separately because they mutually influence each other and should thus be considered from an integrated perspective. This requires individual approaches that are adjusted to the specific (territorial) context. However, various possibilities exist to benefit from the experience of other regions. International examples may provide new ideas to stakeholders and may open up new perspectives on familiar problems. The cooperation with the model regions showed that potentials for regional development can be enhanced in the context of further developing the trans-European transport networks. This is valid for both vertical linkages between the trans-European transport networks and secondary, i.e. regional and local transport networks, and the linking of transport networks and spatial development. Due to complex interrelations, the variety of players and the long-term planning horizons in the transport sector, improving the links of transport networks and its embedding in regional development are not a matter of course – they have to be actively supported and continuously further developed by all players.

Bibliography

ARL (2009): Künftige Herausforderungen der großräumigen Verkehrsentwicklung. Positionspapier aus der ARL, No 79. Hannover.

BAG SPNV, VCD and PRO BAHN (2013): Breite politische Unterstützung für das Konzept Deutschland-Takt - schnelles Handeln notwendig.

Battis, Ulrich and Jens Kersten (2008): Europäische Politik des territorialen Zusammenhalts - Europäischer Rechtsrahmen und nationale Umsetzung. Bonn.

Bauer, Winfried (2014): Wustermark - ein privat geführter öffentlicher Bahnhof für den Güterverkehr. Informationen zur Raumentwicklung 3/2014: 251–253.

BMVBS (ed.) (2009): Handbuch zur Planung flexibler Bedienungsformen im ÖPNV.

BMVBS (2012a): Handbuch für eine gute Bürgerbeteiligung. Planung von Großvorhaben im Verkehrssektor.

BMVBS (2012b): Territorial cohesion in future EU cohesion policy. BMVBS Forschungen, issue 156. Berlin.

Bundesamt für Verkehr (2011): Taktvoll durch die Schweiz.

CASTLE (2009): Description of Selected Best Practices. CASTLE Best Practice Brochure.

COM(1997) 243 (1997): Communication from the Commission to the Council, the European Parliament, the Economic and Social Committee and the Committee of the Regions. Intermodality and intermodal freight transport in the European Union.

COM(2013) 1315 (2013): Regulation (EU) No 1315/2013 of the European Parliament and of the Council of 11 December 2013 on Union guidelines for the development of the trans-European transport network and repealing Decision No 661/2010/EU. http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:348:0001:0128:EN:PDF [14.05.2015]

COM(2013) 1316 (2013): Regulation (EU) No 1316/2013 of the European Parliament and of the Council of 11 December 2013 establishing the Connecting Europe Facility, amending Regulation (EU) No 913/2010 and repealing Regulations (EC) No 680/2007 and (EC) No 67/2010. http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:348:0129:0171:EN:PDF [14.05.2014]

Decision No 1692/96/EC (1996): Decision No 1692/96/EC of the European Parliament and the Council of 23 July 1996 on Community guidelines for the development of the trans-European transport network, in: OJ EC 1996/No L 228. http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:1996D1692:19960910:EN:PDF [14.05.2014]

Deutscher Verband für Wohnungswesen, Städtebau und Raumordnung e.V. (2009): Expertise für den Raumordnungsbericht 2010. Raumrelevante Vorhaben der EU-Kommission.

Kanton Aargau (2007): mobilitätAARGAU - Konzept Mobilitätsmanagement.

Langhagen-Rohrbach, Christian (2012): Moderne Logistik - Anforderungen an Standorte und Raumplanung. Raumforschung und Raumordnung 70: 217–227.

Planungsbüro für Verkehr (2012): Umsetzungskonzept für alternative Bedienungsformen im öffentlichen Personennahverkehr in der Region Mecklenburgische Seenplatte.

Van Ravesteyn, Nico and David Evers (2004): Unseen Europe - A survey of EU politics and its impact on spatial development in the Netherlands. NAi Publishers, Rotterdam Netherlands Institute for Spatial Research.

Region Hannover (2011): Verkehrsentwicklungsplan pro Klima.

Regulation (EC) No 1082/2006 (2006): Regulation (EC) No 1082/2006 of the European Parliament and of the Council of 5 July 2006 on a European grouping of territorial cooperation (EGTC).

Regulation (EU) No 1302/2013 (2013): Regulation (EU) No 1302/2013 of the European Parliament and of the Council of 17 December 2013 amending Regulation (EC) No 1082/2006 on a European grouping of territorial cooperation (EGTC) as regards the clarification, simplification and improvement of the establishment and functioning of such groupings.

Spiekermann, Klaus and Michael Wegener (2005): Raumstrukturelle Auswirkungen einer Internalisierung externer Kosten des Verkehrs in Sachsen. Teilstudie im Rahmen des Projekts "Auswirkungen einer Internalisierung externer Kosten des Verkehrs in Sachsen". Dortmund. http://www.spiekermann-wegener.de/pro/pdf/Sachsen_Endbericht.pdf [01.10.2014]

Spiekermann, Klaus and Michael Wegener (2013): Regional Impacts of a Railway Tunnel between Helsinki and Tallinn. Final Report of the project "H-TTransPlan – Helsinki-Tallinn Transport and Planning Scenarios". Dortmund. http://www.spiekermann-wegener.de/pro/pdf/HTTPS_SuW_FinalReport.pdf [01.10.2014]

Spiekermann, Klaus and Michael Wegener (2014): Integrated Spatial Scenarios until 2050. ET2050 Scientific Report Volume 6. Dortmund. http://www.spiekermann-wegener.de/pro/pdf/ET2050_SR_Vol_6_SASI_020714.pdf [01.10.2014]

Stead, Dominic (2012): Best Practices and Policy Transfer in Spatial Planning. Planning Practice & Research 27: 103–116.

Stead, Dominic and Vincent Nadin (2011): Shifts in territorial governance and the Europeanization of spatial planning in Central and Eastern Europe. In: Neil Adams, Giancarlo Cotella, and Richard Nunes (Hrsg.), Regions and cities. Routledge. 154–177.

Stone, Diane (2012): Transfer and translation of policy. Policy Studies 33/6: 483–499.

TA2020 (2011): Territorial Agenda of the European Union 2020. Towards an Inclusive, Smart and Sustainable Europe of Diverse Regions.

Vallée, Dirk (2012): Leitfaden Logistik.

Vetter, Thomas and Knut Haase (2008): Alternative Bedienformen im ÖPNV - Akzeptanzstudie im Landkreis Saalkreis. Diskussionsbeiträge aus dem Institut für Wirtschaft und Verkehr, TU Dresden (1/2008).

Voß, Hans Peter (2007): Horizontale Supply-Chain-Beziehungen. Potentiale der Zusammenarbeit zwischen Zulieferern in Supply Chains. Vallendar.

Wegener, Michael (2008): SASI Model Description. Working Paper 08/01. Dortmund: Spiekermann & Wegener Stadt- und Regionalforschung. http://www.spiekermann-wegener.de/mod/pdf/AP_0801.pdf [26.05.2015]

Wegener, Michael and Dieter Bökemann (1998): The SASI Model: Model Structure. Berichte aus dem Institut für Raumplanung 40. Dortmund: Institut für Raumplanung, Universität Dortmund; http://www.raumplanung.tu-dortmund.de/irpud/file-admin/irpud/content/documents/publications/ber40.pdf [26.05.2015]

Wuppertal Institut (2005): Erfahrungen aus aufgabenverwandten Forschungsvorhaben. Projektbericht im Rahmen des BMBF-Forschungsvorhabens MultiBus. Wuppertal.

Zwicker-Schwarm, Daniel and Jürgen Gies (2012): Der Beitrag transnationaler Projekte zur Umsetzung der Territorialen Agenda der EU in Deutschland. Themenfeld Mobilität und Verkehr. Handlungsempfehlungen.

Online sources

www.bbt-se.com/en/project/

www.oeresund-bridge.com/facts-and-figures/history.html

www.sintropher.eu/sites/default/files/images/editors/downloads/Sintropher_brochure_-_English.pdf

www.stop-bbt.it/news.html