

A light blue map of Europe is overlaid on the page. The map shows the outlines of European countries, with some countries shaded in a slightly darker blue. The map is centered on the continent of Europe.

# **Transport Infrastructure Benchmarking Europe**

Transport Infrastructure Endowment and Transport Policy  
in Selected European Countries

Management Summary

## **Management Summary**

### **Background, central questions and targets**

The performance of transport infrastructure in Germany is generally rated as high by comparison with other countries. For instance, it is not rare to hear that Germany avails of one of the densest road and rail networks. However, many of our European neighbours can assert a similar claim, and rightly so, since the conditions of transport infrastructure can generally be rated as highly developed in large parts of Europe. Nevertheless, it must be assumed that the national transport infrastructures in Europe differ substantially. This assumption is sustained primarily by the fact that national transport policies have developed very differently despite the risen influence from Brussels.

Reviewing these assumptions for validity necessitates a study to investigate performance and political backgrounds in an international approach. Such a study has not yet been available. This resulted in the need for research.

Against this backdrop, the Institute for Mobility Research (ifmo) has launched the “Transport Infrastructure Benchmarking Europe“ study. The project was handled by the Institute for Transport Science at the Westphalian Wilhelm University of Münster (IVM) and the KCW GmbH company, Berlin.

The central questions and targets of this study are as follows:

- Who are the best? – Recording the performance of the transport infrastructure in selected European countries.
- How do the best do it? – Identification of the relevant areas requiring action in terms of transport policy and regulatory policy and identification of manipulated variables.
- What can we learn from others' best practice? – Derivation of political implications for provision of a more efficient infrastructure.

### **Procedure and structure of the study**

The introductory chapter that explains the backdrop and the issues covered by the study in greater detail is followed by an indicator matrix developed to assess the performance of the transport infrastructures (Chapter 2). A general, top-down approach applicable to all modes of transport is selected for this. It breaks down performance into quantitative criteria that measure the extent of infrastructural endowment and qualitative criteria that record the quality of infrastructure usage (Chapter 2.2):

- **Quantity**
  - Infrastructural endowment (density and distribution)
  - Capacity of the infrastructure
- **Quality**
  - Time required
  - Condition of the infrastructure
  - Safety

These quantitative and qualitative criteria are operationalised in a further step by individual indicators that can be quantified and consequently measured. Actual benchmarking (Chapter 3) is then performed at this level of the individual indicators.

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The study investigates the performance of the transport infrastructures in the following countries:

- Germany
- France
- Italy
- The Netherlands
- Sweden
- Switzerland
- The United Kingdom of Great Britain and Northern Ireland (UK)

The study deals with the transport infrastructures of:

- road,
- rail and
- airports

Inland navigation is not included in the analyses since it has only a very slight importance in some of the countries under investigation. This international benchmarking also dispenses with a comparison of the sea port infrastructures since the major sea ports are relevant to Europe as a whole owing to their international significance, and a comparison at country level would not provide a great deal of information. Certain indicators in relation to the sea ports that are, however, only conditionally informative in relation to the performance of infrastructure at national level but that, in themselves, may be of interest, can be found in the Annex further to the study (can be downloaded at [www.ifmo.de](http://www.ifmo.de) – see also the introduction in Chapter 3).

Following the country-specific analyses of performance, the study also goes on to investigate the performance efficiency for each mode of transport. This covers what investments are reflected by the relevant performance in the individual countries (Chapters 3.1.4, 3.2.4 and 3.3.4).

The political impact analysis is based on a derivation of the transport policy and regulatory policy influencing factors for the performance of transport infrastructure. This involves subjecting transport policy processes and players to a more detailed analysis (Chapter 4.1). The resultant influencing factors are as follows:

- Strategic governance
- Planning and approval processes
- Fiscal federalism
- Private sector involvement
- User financing
- Budget earmarking
- Economic regulation

The influencing factors are each operationalised and scaled by assessable indicators (Chapter 4.2).

On the basis of this, a detailed analysis of the regulatory policy and transport policy terms of reference shows which preconditions exist for provision of infrastructure in the countries under investigation. To conclude, the national transport policies are assessed on the basis of the influencing factors (Chapter 5).

Quantification of the performance on the one hand and quantification of the characteristics of transport policy and regulatory policy influencing factors on the other ultimately allow an analysis of interrelationships between transport infrastructural situations and political terms of reference. Correlation analyses put in concrete terms interrelationships between performance ranking and policy ranking (Chapter 6). Despite the narrow audit sample and the associated restriction to univariate correlation analyses, it has, for the first time, been possible in this study to obtain information on the impact of political action parameters on the actual performance of transport infrastructure from a cross-transport mode and international investigation.

Finally, Germany's position is outlined on a summary basis by comparison with the countries investigated (Chapter 7). Conclusions and options for political action are formulated on the basis of the findings from the rankings and correlation analyses.

## Central results

Some of the most important findings from Chapters 3, 5 and 6 are outlined below in summary form and broken down on the basis of the transport infrastructures investigated.

### Road infrastructure

The Netherlands is, by a wide margin, the benchmark in the case of virtually all performance indicators covering the quantitative density of road infrastructure. This relates both to the **density of the supra-regional road network** and to indicators referred to motorways. It is hardly surprising that Sweden, with its low population density, comes in last for all these indicators but achieves top positions in relation to **distribution of infrastructure** that is very greatly orientated on population density, followed closely by the United Kingdom.

Germany assumes a mid-field position in the case of the indicators of quantitative performance. Germany even ranks only fourth in relation to **density of supra-regional roads**. At least it manages to attain second place in relation to the **motorway density** indicator. The hypothesis that Germany has one of the densest road networks Europe-wide cannot be supported in any case even with this limited sample of countries.

One conspicuous aspect is that, in the case of most countries with good results in relation to infrastructure density, there is also **strategic governance** in respect of infrastructure policy models and targets but, above all, in respect of quantified target parameters. Besides the Netherlands, this also relates to Switzerland and, in some cases, to the United Kingdom. There is an even stronger interrelationship between the distribution of road infrastructure over regions with high population density and the existence of a distinct, strategic governance. Besides applying to Sweden, this also applies to the United Kingdom. Statistically as well, this interrelationship is expressed by a strongly positive correlation for the entire sample of countries. Conversely, Italy is both bottom of the league as far as ratio between road infrastructure and population density goes and the country with the least distinct strategic governance. Likewise Germany: it has a relatively poor showing with regard to the distribution indicators, i.e., here as well, the infrastructure density is comparatively less based on population density and is not characterised by highly distinct strategic governance. The lack of strategic governance is primarily attributable to the fact that the targets of the German government's transport policy are hardly based on quantified, consequently, measurable and verifiable target parameters. In this respect, other countries such as the United Kingdom and also Switzerland have adopted an entirely different transport policy. At all events, the results point out that a road network aligned with population distribution can, in the long term, be implemented better on the basis of strategic governance covering consistent transport policy models, operable target systems and consistent ex-post evaluations than within the framework of project-specific decisions made from case to case.

While the Netherlands achieves a good rating in respect of the quantitative criteria, it shows major weaknesses in respect of qualitative performance. This applies primarily to the **absence of congestion** indicator where it even takes last place by comparison with the other countries. Both Sweden and Switzerland have conspicuous top ratings in this respect, as they also do for the **safety** indicator. In the analysis of transport policy framework, these two countries also stand out by virtue of governance with the emphasis on quality, aimed primarily at these two quality parameters. Viewed overall, France has a particularly good rating in relation to the qualitative criteria.

France is even the benchmark for the important indicator of **connection quality** that, in simple terms, indicates how much time, on average, is required to get from A to B. It is also the benchmark in relation to condition of road infrastructure that is operationalised by the **modernity** indicator. The impact analysis between the qualitative indicators of the performance and the political influencing factors leads to the assumption that a high share of **privately managed and operated major highways**, in combination with a high share of **user financing**, is closely related to good rankings for the **connection quality and modernity** indicators. Germany is also only mid-field as regards the indicators of qualitative performance. This result is in accord with the low levels of the political **influencing factors of private sector involvement and user financing**, assumed to be relevant to quality of road infrastructure.

## Rail infrastructure

Germany achieves a far better rating for quantitative rail infrastructural endowment than it does for roads. By comparison with the countries studied, Germany has, overall, a high **network density with a high capacity and an infrastructure orientated on population distribution**. In both categories this leads to Germany achieving second place in the country ranking. Germany is able to reach only fifth place for the **density of high-speed lines** indicator only, consequently achieving only the weakest positioning among countries availing of high-speed lines. However, it is only just below the countries of Italy and the United Kingdom, achieving a ranking just above that of Germany. The benchmark in this category, as expected, is France with its dense TGV network. Switzerland takes top place in relation to **density of overall rail network and station density**.

The interrelationships between the political influencing factors and quantitative performance features of the rail infrastructure indicate that the influencing factor of **fiscal federalism** is positively interrelated to the indicators **rail network density and station density**. One possible explanation for this could be that, in systems with a distinct federal structure, regional local authorities consider connection to the national rail network to be an important task and also offensively pursue this objective. Germany is the benchmark in the case of the rail system for the important qualitative performance feature of **connection quality**, i.e. the average travel time required between two regions. Germany is closely followed by France and Italy in this respect. In the United Kingdom, it was expected, in view of the maintenance crisis, that there would be weaknesses in relation to **punctuality, modernity and safety**. Germany's punctuality rating is not that good either. It achieved only fifth place as regards punctuality. Switzerland is the benchmark in this sector and, in turn, France takes second place. In respect of punctuality, there are relatively strong interrelationships between the distinctiveness of political influencing factors and the ratings achieved by the countries in the ranking. Consequently, it can be seen that there is a strongly positive correlation with the influencing factor of **planning and approval procedures**, that is also interrelated to the indicators of **modernity and safety**. This leads to the assumption that expansion measures can be implemented more quickly in the rail sector thanks to speedier planning procedures, and these expansion measures can, in turn, impact on promoting the qualitative performance. Consistent **strategic governance** also seems to impact on **punctuality in rail transport**, as does **modernity**. Consequently, it can be assumed that a stringent transport policy, together with the courage to aim at quantifiable target variables, results in greater focussing on maintenance and repair tasks that are of elementary significance for the performance of the rail infrastructure.

## Airport infrastructure

The Netherlands take first place in relation to airports as regards **density of take-off and landing runways**. Viewed relatively, this indicates Germany's major weakness in this infrastructure sector. In respect of **density of take-off and landing runways** overall, Germany reaches only last place but one. This contradicts the widespread hypothesis that Germany's airport infrastructure is overdimensioned. This is not the case, at least on the basis of a European comparison. This weak position is less pronounced in relation to **density of long-haul air-**

**ports** where Germany nevertheless ranks third by comparison of the countries studied. One positive aspect worth emphasising is that airports in Germany are located where the population is concentrated. This is shown by Germany's second place after the benchmark, the United Kingdom, in relation to **distribution indicators**. The highest **capacity of long-haul airports**, measured by population density is achieved by Switzerland, both landside and airside, ranking even in front of the Netherlands.

Switzerland, with its efficient rail network, is also the benchmark in relation to density of airports with direct rail link. Germany, at least, takes second place in this respect. The best **connection quality**, as far as roads are concerned, is achieved by Italy however. Germany ranks only fifth in this case.

In relation to capacity of long-haul airports, we can see a strong interrelationship with one political influencing factor: there is a strongly positive correlation with **strategic governance**. This indicates that due consideration is given to the high importance of such airports, from an overall economic point of view, by ensuring an appropriate infrastructural endowment and a high performance in the case of strong strategic governance. The example of the Netherlands indicates that the government's strategy of concentrating limited resources within the framework of the Mainport concept at Schiphol Airport is comparatively successful. Germany, with its less distinct strategic governance on the part of the Federal Government, then also achieves only lower rankings accordingly for the capacity indicators of long-haul airports. Both the design of federal division of authority in Germany and the current German airport policy reveal efficiency potentials in this respect.

It can also be stated that there is a similarly strong interrelationship between the political influencing factor of **planning and approval procedures** and the **density of take-off and landing runways** but also with the capacities of the long-haul airports. This correlates well with the fact that countries with a high degree of concentration for planning and approval procedures and comparably short procedures, such as the Netherlands or Switzerland, have a good ranking for density and capacity. In Germany, it can be assumed that improvement potentials could be implemented in view of the frequently long drawn-out and difficult planning procedures (two current examples being Frankfurt/Main and Berlin-Schönefeld for instance) even if each individual case must be assessed on a differentiated basis.

### **Appraisal of the results**

If we consider all modes of transport taken together, it can be clearly seen that the cause-effect relationships for road, rail and airports are sometimes very different. One **political influencing factor** does, however, show significant and, in some cases, strongly positive correlations with the performance indicators for all modes of transport despite the relatively small sample size of seven countries, both for the quantitative indicators and the qualitative indicators: **strategic governance**. A stringent, authentic transport policy that derives its infrastructural measures from **recognisable models**, provides **verifiable targets** and evaluates its infrastructural measures **consistently** appears to be rewarded with an increase in performance of transport infrastructure.

The „Transport Infrastructure Benchmarking Europe“ Study enters uncharted territory, particularly in respect of content, but also methodologically. It supplies new findings in relation to the performance of the transport infrastructures in Europe. Moreover, it offers valuable clues for a discussion of transport policy and regulatory policy options for action. Only a few of these findings and clues can be found in this Management Summary. We consequently wish to encourage readers to familiarise themselves in greater detail with this publication and wish them stimulating and provocative reading.

## **Imprint**

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