

2018



## **WORLDWIDE MARKET FOR RAILWAY INDUSTRIES**

**Market Volumes for OEM Business and After-Sales  
Service as well as Prospects for Market Developments  
of Infrastructure and Rolling Stock**

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*Available in English from 14<sup>th</sup> September 2018.*

*Now you can also purchase the **data annex in Excel format** (see overview data sheets on page no. 5 for more information).*

Every two years, SCI Verkehr publishes the MultiClient study “Worldwide Market for Railway Industries”, which summarises the main contents of more than 20 in-depth studies of the various railway industry segments. As a basis for specialised strategic consultancy for railway companies and the railway industry, SCI Verkehr conducts bottom-up analyses of all relevant product segments. An extensive self-developed database allows SCI Verkehr to analyse business segments, market regions and even individual country markets. Thanks to the project-based data collection, the database also provides input for a detailed analysis of OEM and after-sales markets. SCI Verkehr has enhanced its methodologies over the years and can, for example, develop its forecasts based on the real age structures of fleets. Coinciding with the InnoTrans 2018 trade fair, the new MultiClient study “Worldwide Market for Railway Industries 2018” will inform customers from the railway industry about the current status of both the infrastructure and the rolling stock markets as well as about the future development in all world regions.

### **In concrete terms, this market study of the worldwide market for railway industries includes:**

- An overview of the market development of the worldwide market for railway industries, subdivided into world market regions and product segments
- Structure and development of the global railway technology market in Western and Eastern Europe, North and South America, Asia, Australia/Pacific, the CIS and Africa/Middle East
- Size of the market, market development and future procurement potential for the product segments infrastructure, system technology and rolling stock until 2022
- List of infrastructure stocks and fleets for the main countries and operators and important vehicle and infrastructure projects in the period from 2013 to 2017

SCI Verkehr analyses markets from the bottom up: based upon systematic observation of the railway markets, a detailed worldwide database of the installed base and projects forms the basis for in-depth studies on the various segments of the railway industry and the most important regional focus markets. Through the continuous production of its MultiClient Series, SCI Verkehr systematically analyses 35 core countries and more than 100 individual markets for railway industries. These studies also go into further detail regarding technological and railway operational aspects, which are not illustrated in this study.

SCI Verkehr GmbH is an independent consultancy company specialising in the markets and economics of transport. We have close connections to the rail industry, with consultants in a wide range of specialist fields. We have an extensive network of experts in Germany and abroad and we specialise in market and strategy issues for the mobility sector. Our activities focus on companies in the transport and rail industry, logistics, public and private transport companies and transport and economics departments in public administrations at national, regional and municipal levels.

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#### 1 Market overview

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- 1.4 Global transport performance (Data)
- 1.5 Market volumes Top 10 countries (Data)
- 1.6 Market volumes Top 10 manufacturers (Data)

**1.2 Market volumes of the largest markets**

| Market Volume in Billion Euro | Market Segment | OEM | After Sa |
|-------------------------------|----------------|-----|----------|
| Asia                          |                | XXX | X        |
| China                         |                | XXX | X        |
| India                         |                | XXX | X        |
| Japan                         |                | XXX | X        |
| Rest of Asia                  |                | XXX | X        |
| Western Europe                |                | XXX | X        |
| Germany                       |                | XXX | X        |
| France                        |                | XXX | X        |
| United Kingdom                |                | XXX | X        |
| Italy                         |                | XXX | X        |
| Spain                         |                | XXX | X        |
| Rest of Western Europe        |                | XXX | X        |
| North America                 |                | XXX | X        |

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- 2.6 Drivers of supply and demand (Data)
- 2.7 Regional transport performance (Data)
- 2.8 Regional transport performance CAGR (Data)

| Subcriteria              | Unit | Year | Value |
|--------------------------|------|------|-------|
| Rail Freight Transport   | tkm  | 2005 | XXX   |
| Rail Passenger Transport | pkm  | 2005 | XXX   |
| Rail Freight Transport   | tkm  | 2005 | XXX   |
| Rail Passenger Transport | pkm  | 2005 | XXX   |
| Rail Freight Transport   | tkm  | 2005 | XXX   |
| Rail Passenger Transport | pkm  | 2005 | XXX   |
| Rail Freight Transport   | tkm  | 2005 | XXX   |
| Rail Passenger Transport | pkm  | 2005 | XXX   |
| Rail Freight Transport   | tkm  | 2005 | XXX   |
| Rail Passenger Transport | pkm  | 2005 | XXX   |
| Rail Freight Transport   | tkm  | 2005 | XXX   |
| Rail Passenger Transport | pkm  | 2005 | XXX   |
| Rail Freight Transport   | tkm  | 2005 | XXX   |

#### 3 Market volumes

- 3.1 Market volumes overview (Pivot)
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- 3.3 Market volumes overview (Data)
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**3.2 Market volumes of**

| Region                    | Market OEM |
|---------------------------|------------|
| Regions                   | 2017       |
| Western Europe            | XX         |
| Eastern Europe            | XX         |
| North America             | XX         |
| South and Central America | XX         |
| Asia                      | XX         |
| CIS                       | XX         |

#### 4 Market shares

- 4.1 Infrastructure manufacturers (Pivot)
- 4.2 Rolling stock overview (Pivot)
- 4.3 Infrastructure manufacturer (Data)
- 4.4 Rolling stock overview (Data)

| Product Subsegment | Subcriteria  | Unit         | Year      | Value |
|--------------------|--------------|--------------|-----------|-------|
| Total              | voestalpine  | million euro | 2013-2017 | X     |
| Total              | Vossloh      | million euro | 2013-2017 | X     |
| Total              | Evrz         | million euro | 2013-2017 | X     |
| Total              | CRCC         | million euro | 2013-2017 | X     |
| Total              | CRECG        | million euro | 2013-2017 | X     |
| Total              | Koppers      | million euro | 2013-2017 | X     |
| Total              | China Baowu  | million euro | 2013-2017 | X     |
| Total              | Stella-Jones | million euro | 2013-2017 | X     |

## 5 Installed base

- 5.1 Installed base infrastructure overview (Pivot)
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- 5.3 Installed base infrastructure overview (Data)
- 5.4 Installed base rolling stock (Data)

5.1 Installed base infrastructure overview

| Region                    | 2017 (in route-km) | CAGR      |
|---------------------------|--------------------|-----------|
| Western Europe            | XXX                | XX        |
| Eastern Europe            | XXX                | XX        |
| North America             | XXX                | XX        |
| South and Central America | XXX                | XX        |
| Asia                      | XXX                | XX        |
| CIS                       | XXX                | XX        |
| Africa/Middle East        | XXX                | XX        |
| Australia/Pacific         | XXX                | XX        |
| <b>Total</b>              | <b>XXX</b>         | <b>XX</b> |

## 6 Annex infrastructure

- 6.1 Installed base overview (Pivot)
- 6.2 Installed base details (Pivot)
- 6.3 Infrastructure projects (Pivot)
- 6.4 Installed base infrastructure overview (Data)
- 6.5 Installed base infrastructure details (Data)
- 6.6 Infrastructure projects (Data)

| Subsegment | Subcriteria | Unit     | Year | Value |
|------------|-------------|----------|------|-------|
| ed         | Total       | route-km | 2017 | XXX   |
| ectrified  | Total       | route-km | 2017 | XXX   |
| ed         | Total       | route-km | 2017 | XXX   |
| ectrified  | Total       | route-km | 2017 | XXX   |
| ed         | Total       | route-km | 2017 | XXX   |
| ectrified  | Total       | route-km | 2017 | XXX   |
| ed         | Total       | route-km | 2017 | XXX   |
| ectrified  | Total       | route-km | 2017 | XXX   |
| ed         | Total       | route-km | 2017 | XXX   |
| ectrified  | Total       | route-km | 2017 | XXX   |
| ed         | Total       | route-km | 2017 | XXX   |
| ectrified  | Total       | route-km | 2017 | XXX   |
| ed         | Total       | route-km | 2017 | XXX   |
| ectrified  | Total       | route-km | 2017 | XXX   |
| ed         | Total       | route-km | 2017 | XXX   |
| ectrified  | Total       | route-km | 2017 | XXX   |

## 7 Annex rolling stock

- 7.1 Installed base countries (Pivot)
- 7.2 Installed base age distribution (Pivot)
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- 7.10 Deliveries countries (Data)
- 7.11 Deliveries age distribution (Data)
- 7.12 Deliveries technical details (Data)

7.5 Deliveries rolling stock manufacturer

| Region               | Units                   |
|----------------------|-------------------------|
| Africa / Middle East | GE Transportation XXX   |
|                      | CRRC XXX                |
|                      | EMD XXX                 |
|                      | Other Manufacturers XXX |
|                      | Bombardier XXX          |
|                      | Alstom XXX              |
|                      | Siemens XXX             |
|                      | Grindrod XXX            |
|                      | CAF XXX                 |
|                      | KinkiSharyo XXX         |
|                      | Hyundai Rotem XXX       |
|                      | UCW XXX                 |
|                      | Hitachi Rail XXX        |
|                      | Azovmash XXX            |
|                      | Transnet XXX            |
|                      | Uralvagonzavod XXX      |
|                      | Wagon Pars XXX          |
|                      | Talgo/Bombardier XXX    |
|                      | SEMAF XXX               |
|                      | Wagon Pars Co. XXX      |
| Asia                 | DLW XXX                 |
|                      | GE Transportation XXX   |
|                      | TMH XXX                 |
|                      | CRRC XXX                |
|                      | Other Manufacturers XXX |
|                      | Bombardier XXX          |
|                      | Alstom XXX              |
|                      | CAF XXX                 |
|                      | ICF XXX                 |
|                      | BEML XXX                |
|                      | Nippon Traction XXX     |

## 8 Additional tables

- 8.1 Additional figures

## Extract from the Study

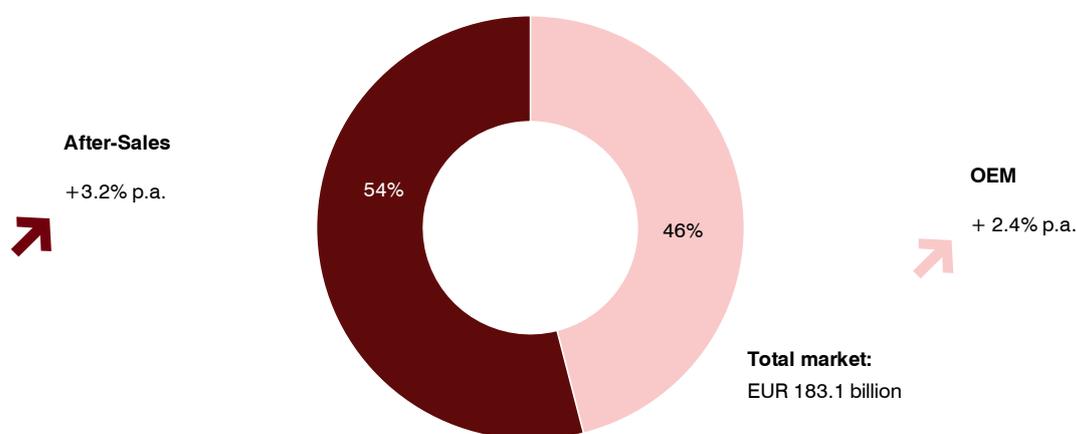
### 1 Executive Summary: Worldwide Market for Railway Industries

[...]

#### Increase in new business – stable growth in After-Sales

The share of the After-Sales market increased from 53% to 54% of the global market for railway technology. Better prospects are expected for new business, as the annual growth rate has increased from 1.3% (2016) to 2.4% while the expected growth in the After-Sales segment remains at 3.2% p.a.

#### Share of After-Sales and OEM segment of the world market (%) and market growth until 2022



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Figure 1: Share of After-Sales and OEM segment of the world market (%) and market growth until 2022

Data table (additional offer): 3.1 Market volumes overview

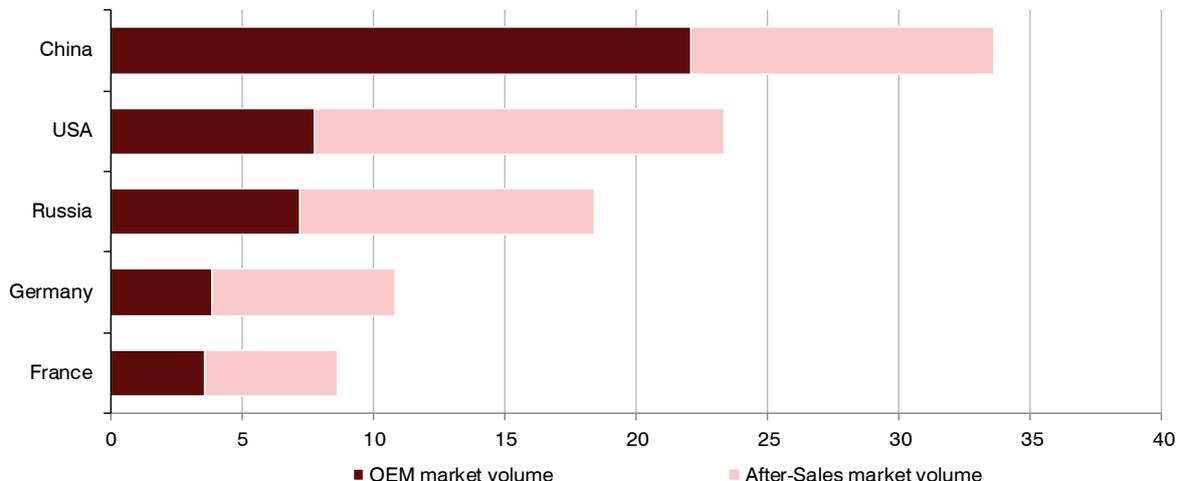
#### China is losing momentum – Europe and North America show growth above average

China, which is by far the largest national market with a market volume of over EUR 33 billion p.a., is decreasing after decades of exceptional growth. The Chinese market will decrease by -0.4% up to 2022, while other countries are expecting a 3.5% growth rate.

Declining public investment in the high-speed rail (HSR) network, which is being consistently developed, as well as the introduction of stricter investment criteria regarding metro systems, will create barriers to growth for the passenger transport markets. This development will have a strong impact on the OEM market, which according to SCI Verkehr estimations will decrease by around -5% p.a. in the next five years. Increasing investment in small-scale light rail transit (LRT) systems and intercity networks will not be able to balance out these developments. However, the After-Sales market will continue to grow through fleet expansion and higher maintenance requirements.

Positive impetus will come from rail freight transport. China is also experiencing a restructuring within the freight market, in that there is a decline in transport in the heavy industry and a shift to lighter goods in containers, which is promoted through the improvement of framework conditions for the railway. The goal is to reduce environmental pollution in cities and to increase the portion of rail freight to 30%. This will positively affect the procurement of new rail freight rolling stock, flexible transport systems and environmentally-friendly locomotives.

Top-5 worldwide railway markets for OEM and After-Sales 2017 (EUR billion)



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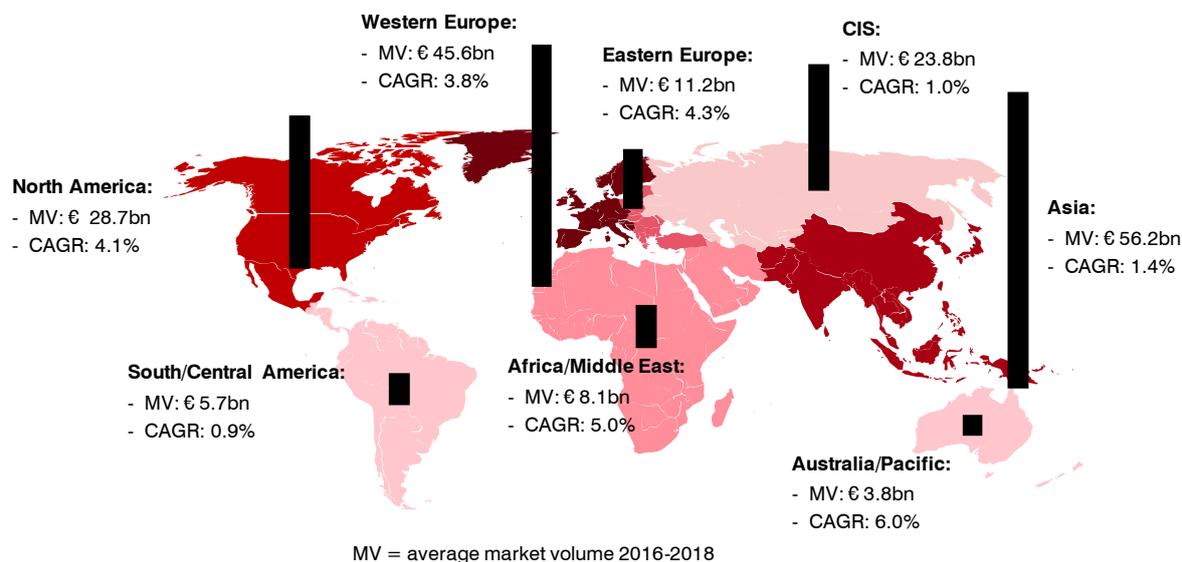
Figure 2: Top-5 worldwide railway markets for OEM and After-Sales (EUR)

Data table (additional offer): 1.2 Market volumes of the largest markets

Other top-5 countries are USA, Russia, Germany and France. These five countries are responsible for 50% of the total railway market in 2017.

Asia currently accounts for 30.7% of the worldwide railway market and Western and Eastern Europe together for 31.0%. Because of its declining market, growth expectations in China are limited to 1.4% p.a. in the next five years.

Current market volume (MV) and growth rate (CAGR) by regions until 2022



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Figure 3: World market regions with market volume (EUR) and market development until 2022 (%)

Data table (additional offer): 3.1 Market Volumes Overview

With 5.0% p.a. still a significant growth potential lies in African and Middle East countries. This market increased considerably from approx. EUR 7 billion in 2016 to EUR 8.1 billion in 2018. Total growth in the region is driven by large projects under implementation, especially in the Middle East but also in African countries. The highest growth rate is expected for the Australia / Pacific region. Large infrastructure projects and record spending for public transport is driving this EUR 3.7 billion market.

[...]

#### 4 Characteristics and Transport Development in the World Market Regions

[...]

##### 4.3 North America

North America encompasses the USA, Canada and Mexico. The region is largely influenced by developments in the USA. The country's inhabitants represent around two-thirds of the population and it generates more than 86% of the region's GDP. This makes the USA the economy with the highest GDP in the world.

| Countries considered in North America |        |     |
|---------------------------------------|--------|-----|
| Canada                                | Mexico | USA |
|                                       |        |     |

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Table 1: North America – Countries

##### 4.3.1 Political and Socio-Economic Drivers

The region is characterised by stable political systems. It offers investors reliable conditions and facilitates a high security degree for planning. The status of the **USA as the world's strongest economic power**, which generates more than 20% of the global GDP, is based on a territory that is rich in raw materials and well developed. It has a large domestic market with around 326 million inhabitants and economic and financial systems characterised by entrepreneurship and formerly free trade. However, the imposition of custom duties on various groups of goods by the current government is likely to result in unpredictable alterations in world trade in nature and extent. In addition, the US is further moving away from Mexico and Canada on a political level, which becomes apparent, inter alia, after the questioning the NAFTA contract.

The North American **rail freight transport is mostly private** and the influence of the state is low. The development of HSR corridors, e.g. in California, in some cases has faced controversial political debate. The common practice of not providing funding support, but instead implementing pre-planned sections through partial funding, is hindering a more intensive development of this segment.

| Stability of the political system |                        |                             |
|-----------------------------------|------------------------|-----------------------------|
| Creditworthiness index (0 - 100)  | National debts (% GDP) | Ease of doing business rank |
| XXX                               | XXX                    | 9                           |

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Table 2: North America – Stability of the political system  
Data table (additional Offer): 2.1 Socio-economic Drivers

North America has the highest creditworthiness index worldwide and has **easy access to capital markets**. Because of the high degree of freedom of the economic and financial system, there are almost no limits when it comes to financing projects, provided that the projects are profitable. In Mexico, however, there is a considerably higher political and economic instability than in the USA and

Canada. Therefore, the Mexican creditworthiness index is significantly lower, registering only 71 points on a scale from 0 to 100.

The above-average US national debt is worth noting: It is 107.8% of the GDP. Canada and Mexico have a national debt rate of 87.7% and 54.2% of the GDP, respectively.

| Economic power and economic growth 2017 |                             |  |               |
|---|-----------------------------|--|---------------|
| GDP (USD million)                       | GDP per capita in PPP (USD) | Real economic growth up to 2022 (% p.a.) | Inflation (%) |
| 22 192                                  | XXX                         | XXX                                      | +2.3          |

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Table 3: North America – Economic power and economic growth  
Data table (additional offer): 2.1 Socio-economic Drivers

The North American economic power is the highest in the world. Compared to Western Europe, a much higher economic growth is forecast for North America, indicating the dynamic development of the region. **Mexico will display the greatest economic growth in the period up to 2022.** With almost 125 million inhabitants, Mexico is the country with the second largest population in the region and its forecasted increase in income is significant for the development of transport. The close economic interdependence of the countries, promoted by the membership of all three of NAFTA and the OECD, is advantageous for rail transport. However, the current developments call into question the future of the NAFTA agreement in its current form. The outcome of the negotiations cannot be foreseen yet.

| Demographic structure and development in North America 2017 |   |                                       |   |
|---|---|---------------------------------------|---|
| Population (million)  | Population density (inhabitants per km <sup>2</sup> ) | Population growth up to 2022 (% p.a.) | Degree of urbanisation (% urban population) |
| 486   | XXX   | XXX                                   | 81  |

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Table 4: North America - Demographic structure and development in North America 2017  
Data table (additional offer): 2.1 Socio-economic Drivers

North America has a noticeably **younger population than Western Europe and other industrial regions**. The positive population development is also noteworthy and should continue to rise in the next few years, which will have a positive effect on transport demand. Transport demand is also characterised by high degree of urbanisation and a focus on the US metropolises on the west and east coasts. Despite the high level of urbanisation, it will continue to rise in the coming years.

#### 4.3.2 Drivers of Demand

| Importance of the railway system          |   |                     |
|---|---|---------------------|
| Modal split of rail freight transport (%) | Modal split of passenger rail transport (%) | Investment activity |
| XXX                                       | <1  | Medium              |

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Table 5: North America – Importance of the railway system  
Data table (additional offer): 2.2 Drivers of Supply and Demand

The importance of railways for passenger and freight transport in North America is reflected in the modal split values. **While the rail share in passenger transport is below 1%, over one third of the**

**freight transport performance takes place on railways.** With large transport distances, integrated and large structure clearances plus very high reliable axle loads, higher quantity effects can be achieved than in Europe. On the other hand, trans-regional passenger rail transport remains substantially below its economic possibilities, also taking into account the attractiveness of air transport for very long journey distances.

The **attractiveness of road transport** is important both for long-distance and for local transport. Low oil prices, developed infrastructure and cultural orientation towards individuality contribute to this trend. Rail passenger transport performance is generated mostly in metropolitan areas. Noteworthy long-distance passenger rail transport only exists on the East Coast of the USA.

| Rail infrastructure 2017               |                                  |  |   |
|--|----------------------------------|--|---|
| Mainline railway network<br>(route-km) | Urban rail network<br>(route-km) | Network density<br>(route-km/100 km <sup>2</sup> ) | Degree of mainline railway<br>electrification (%) |
| XXX                                    | 3 310                            | XXX  | 1   |

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Table 6: North America – Rail Infrastructure 2017  
Data table (additional offer): 2.2 Drivers of Supply and Demand

The network in North America is the longest in all world market regions, but lines are single track for the most part and only have a very low degree of electrification. The **technology level of infrastructure, in some cases, is significantly lower** than in Western Europe and typically leads to long sections that only allow comparatively low speeds. Large train lengths and high train weights provide sufficient operational capacity under these circumstances. Indirectly, this also applies to track system products, which, above all, need to be durable and reliable. Therefore, they are often more material-intensive (“heavier”) than in other market regions, more expensive to procure and are often refurbished and reused after the first operating cycle.

In view of the sometimes already high and still increasing train weights on important main lines, leading network operators in the region are considering the development and use of innovative technologies. At the same time, due to various accidents, the introduction of a new train control system (Positive Train Control, PTC) will become mandatory for trains carrying passengers or dangerous goods by the end of 2018. The date of introduction has already been postponed a few times and the required equipment will probably cover only parts (50%) of the route by then.

| Transport performance 2017             |                              |  |                              |
|--|------------------------------|--|------------------------------|
| Rail freight transport                 |                              | Rail passenger and urban transport     |                              |
| Transport performance<br>(million tkm) | Growth 2012-2017<br>(% p.a.) | Transport performance<br>(million pkm) | Growth 2012-2017<br>(% p.a.) |
| XXX                                    | +0.1                         | XXX                                    | +0.8                         |

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Table 7: North America – Transport performance  
Data table (additional offer): 2.4 Regional transport performance CAGR

[...]

#### 4.3.4 Market Development

[...]

| Market for railway industries: Rail modes |  |                         |   |
|---|--|-------------------------|---|
| Segment                                   | Current Average Market Volume 2017 (EUR million) | CAGR 2017–2022 (% p.a.) | Future Average Market Volume 2022 (EUR million) |
| HSR                                       | 194  | XXX                     | XXX   |
| Conventional railway                      | XXX  | +3.6                    | XXX   |
| Urban transport                           | XXX  | +2.9                    | XXX   |
| PIT (all rail modes)                      | 208  | XXX                     | XXX   |
| <b>Total</b>                              | <b>XXX</b>                                       | <b>+4.1</b>             | <b>XXX</b>                                      |

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Table 8: North America – Market for railway industries: Rail modes  
Data table (additional offer): 3.1 Market Volumes Overview

In particular, thanks to anticipated replacement procurements in HSR transport, the market will grow significantly starting from a very low level.

[...]

| Market for railway industries: Main product segments |  |                         |   |
|--|--|-------------------------|---|
| Segment  | Current Average Market Volume 2017 (EUR million) | CAGR 2017–2022 (% p.a.) | Future Average Market Volume 2022 (EUR million) |
| Infrastructure                                       | 6 031  | XXX                     | XXX   |
| System technology                                    | 1 485  | XXX                     | XXX   |
| Rolling stock  | XXX  | +4.4                    | XXX   |
| <b>Total</b>   | <b>XXX</b>                                       | <b>+4.1</b>             | <b>XXX</b>                                      |

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Table 9: North America – Market for railway industries: Main product segments  
Data table (additional offer): 3.1 Market Volume Overview

SCI Verkehr expects the lowest growth rates at 2.7% in the market for infrastructure, while the market for system technology and rolling stock will grow more strongly, e.g. due to retrofitting of existing safety technology and increasing demand for wagons and diesel locomotives, in particular.

| Market for railway industries: Business segments |  |                         |   |
|--|--|-------------------------|---|
| Segment  | Current Average Market Volume 2017 (EUR million) | CAGR 2017–2022 (% p.a.) | Future Average Market Volume 2022 (EUR million) |
| OEM market                                       | 9 750  | XXX                     | XXX   |
| After-Sales market                               | XXX  | +3.0                    | XXX   |
| <b>Total</b>                                     | <b>XXX</b>                                       | <b>XXX</b>              | <b>XXX</b>                                      |

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Table 10: North America – Market for railway industries: Business segments  
Data table (additional offer): 3.1 Market Volumes Overview

[...]

## 5 The Market for Infrastructure

### 5.1 Track Systems

#### 5.1.1 Definition and Brief Description

| Criteria            | Brief description  |
|---------------------|--|
| Definition          | <p>Track systems are made up of rails connected via rail fastenings to either sleepers embedded in ballast, to other suitable materials, or to a ballastless track (comprising monolithically cast concrete or concrete elements). Rails are joined together either by rail connectors (fishplates) or are welded together without gaps.</p> <p>Other elements of the track system (for both types of construction) include turnouts (switches, points) and crossings, which are manufactured separately and integrated into track systems if necessary, as well as a number of components securing the operational function of the track system (e.g. rail end blocks) or reducing undesirable effects on railway operation (e.g. air- and structure-borne noise).</p>  |
| Fields of operation | The track system forms the basis for every type of rail transport.   |
| Delimitation        | <p>The overall term "track systems" does not by itself constitute a product group. Instead, track systems are made up of a multitude of products, each available in different variations. Some of these represent coordinated technical subsystems, some can be operated freely and some are entirely optional. Each subsystem and each product that can be operated freely forms its own submarket.</p> <p>A track system only becomes operable when all of its components are available in sufficient quantity and quality at the same time. Suppliers and network operators therefore have to focus on a complete functioning system, although the components are normally procured separately in form of independent products.</p>   |
| Assessment basis    | Due to the variety of products and limited space, this study does not include a breakdown by product segment and specification of quantities. Instead, the market volume will be given in monetary units for the entire track system in question.  |
| Service life        | <p>The operating life largely depends on the properties of the selected products and subsystems and the specific operational demands on the respective track system; this is not always optimal, for instance due to budget restrictions.</p> <p>In general, points have the shortest life cycle at ten to 30 years, and at the same time they also require the most maintenance.</p> <p>Rails can remain in tracks for some 20 to 40 years.</p> <p>The life cycle of ballast is around 25 to 40 years, depending on the material used.</p> <p>Wooden and steel sleepers usually have to be changed after around 25 to 40 years; concrete or plastic sleepers can last for around 50 years.</p> <p>The service life of ballastless tracks is estimated at 50 to 60 years; in-depth practical experience, however, is only available to a limited extent.</p> |
| After-Sales         | <p>Renewal and maintenance of track systems are the equivalents of the After-Sales market in the rolling stock segment. They include all product procurements and services carried out after the track system goes into operation to maintain or to create a defined operational standard of performance.</p> <p>In contrast, new development and upgrade includes all product procurements and services which are performed to achieve a higher operational standard of performance than the previous situation.</p>  |

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Table 11: Description of Criteria

## 5.1.2 Suppliers

[...]

## 5.1.3 Drivers of Procurements

The most important drivers for track system products:

| Driver   | Brief description  | Relevance | Trend |
|--|--|-----------|-------|
| Available investment funds   | In all market regions, public budgets decisively influence projects for the development of infrastructure networks- directly or indirectly. Even if funds are provided by private investors, public guarantees are often required. In addition, international financial institutions often play an important role. As a result, public funding can be secured in almost all cases.   |           |       |
| Revenues of network operators  | Revenues from transport operations are the second principal element of investment funding. Besides covering the cost of operation, they are mainly used to fund maintenance and renewals. Recent developments in several principal markets show that these tasks are underfunded and need enhanced attendance in the future. With major corridors (e.g. between China, the CIS countries and Western Europe) under development and passenger transport seeing a revival in several regions in Africa, the CIS, the Middle East and Asia, this funding channel has recently gained more significance and influence again. |           |       |
| [...]  | [...]  | [...]     | [...] |
| Relevance for procurements:  = very high,  = high,  = medium,  = low,  = none<br>5-year trend:  = strongly increasing,  = increasing,  = constant,  = decreasing,  = strongly decreasing |  |           |       |
| © SCI Verkehr GmbH   |  |           |       |

Table 12: Track Systems – Relevance and trends of drivers

## 5.1.4 Installed Base, Market Volume and Development

[...]

| Track systems: Installed Base and Development                       |                                    |                            |                                    |
|---|------------------------------------|----------------------------|------------------------------------|
| Region  | Installed Base 2017<br>(route-km)* | CAGR 2017–2022<br>(% p.a.) | Installed Base 2022<br>(route-km)* |
| Western Europe  | XXX                                | XXX                        | XXX                                |
| Eastern Europe  | 89 720                             | XXX                        | 91 530                             |
| North America   | XXX                                | +0.1                       | XXX                                |
| South and Central America   | XXX                                | +1.1                       | XXX                                |
| Asia  | XXX                                | +2.9                       | XXX                                |
| CIS   | 191 320                            | XXX                        | XXX                                |
| Africa/Middle East  | XXX                                | +2.5                       | XXX                                |
| Australia/Pacific   | XXX                                | +0.2                       | XXX                                |
| <b>Total</b>  | <b>XXX</b>                         | <b>XXX</b>                 | <b>XXX</b>                         |
| Figures at year's end. * Figures rounded to the nearest 10 route-km |                                    |                            |                                    |
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Table 13: Track Systems – Installed Base and Development  
Data table (additional offer): 5.1 Installed Base Infrastructure Overview

[...]

The average worldwide market volume of products and services in the field of track systems amounts to approx. EUR 35.7 billion in 2017 and will have grown to approx. EUR 39.3 billion in 2022 (CAGR: +2.0%). This can be broken down by OEM and After-Sales and by market regions as follows:

| Track Systems: New Development and Upgrade (OEM) |  |                         |   |
|--|--|-------------------------|---|
| Region   | Current Average Market Volume 2017 (EUR million) | CAGR 2017–2022 (% p.a.) | Future Average Market Volume 2022 (EUR million) |
| Western Europe                                   | XXX  | XXX                     | 2 726   |
| Eastern Europe                                   | XXX  | +6.4                    | 1 631   |
| North America                                    | 442  | XXX                     | XXX   |
| South and Central America                        | XXX  | XXX                     | XXX   |
| Asia   | XXX  | XXX                     | 4 432   |
| CIS  | XXX  | XXX                     | 1 237   |
| Africa/Middle East                               | XXX  | +5.9                    | XXX   |
| Australia/Pacific                                | 397  | XXX                     | XXX   |
| <b>Total</b>                                     | <b>XXX</b>                                       | <b>XXX</b>              | <b>XXX</b>                                      |

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Table 14: Track Systems - New development and upgrade (OEM)  
Data table (additional offer): 3.2 Market Volumes of Product Segments

[...]

| Track Systems: Renewal and Maintenance (After Sales) |  |                         |   |
|--|--|-------------------------|---|
| Region   | Current Average Market Volume 2017 (EUR million) | CAGR 2017–2022 (% p.a.) | Future Average Market Volume 2022 (EUR million) |
| Western Europe                                       | XXX  | +2.8                    | XXX   |
| Eastern Europe                                       | XXX  | +2.6                    | 1 524   |
| North America  | XXX  | +2.1                    | XXX   |
| South and Central America                            | XXX  | XXX                     | 869   |
| Asia   | XXX  | +4.7                    | XXX   |
| CIS  | 2 542  | XXX                     | XXX   |
| Africa/Middle East                                   | XXX  | XXX                     | 1 199   |
| Australia/Pacific                                    | XXX  | +2.2                    | XXX   |
| <b>Total</b>   | <b>XXX</b>                                       | <b>+3.0</b>             | <b>XXX</b>                                      |

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Table 15: Track Systems – Renewal and Maintenance (After Sales)  
Data table (additional offer): 3.2 Market Volumes of Product Segments

[...]

### 5.1.5 Developments in the World Market Regions

#### Western Europe

- Western Europe holds a 14% share in the world's networks, but more than a quarter of the market volume. In addition to its role as the "berth" of railway technology and traditional technology

leader, this market owes its leading position to relatively high product price levels. However, market dynamics have become significantly lower than in other market regions.

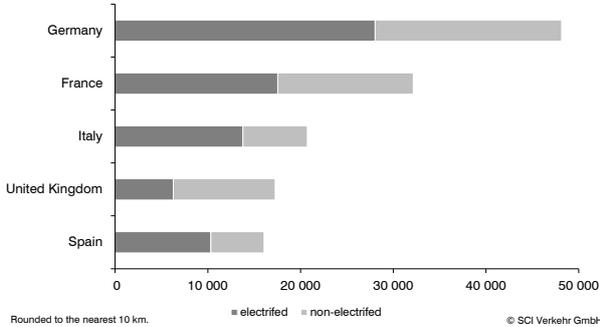
[...]

**ANNEX (excerpt)**

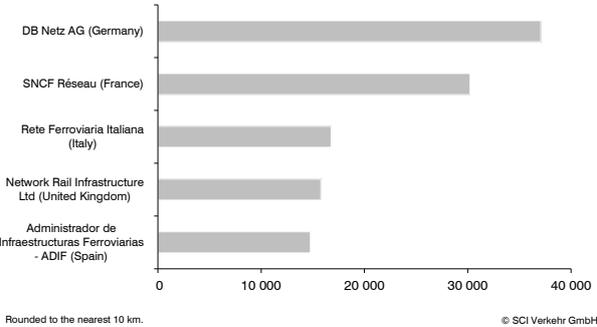
**1 Western Europe**

**1.1 Infrastructure**

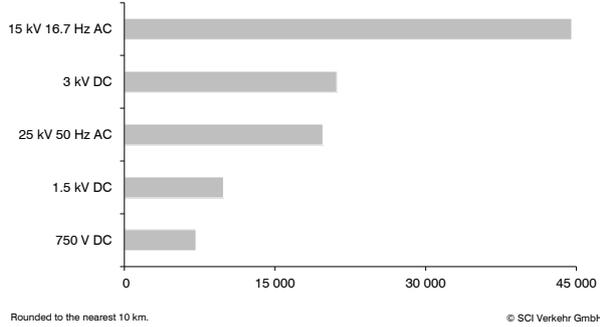
**Largest Networks by Country (route-km)**



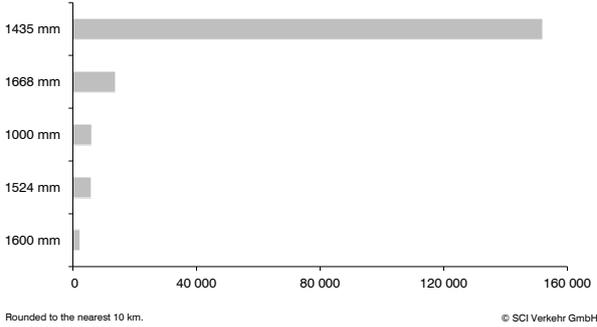
**Largest Infrastructure Managers (route-km)**



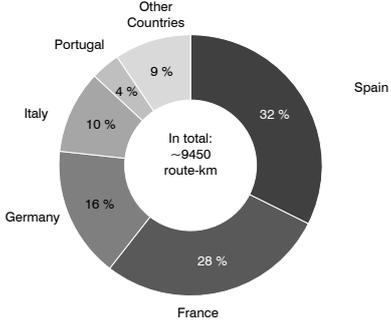
**Largest Electrified Networks by Voltage System (route-km)**



**Largest Networks by Gauge (route-km)**



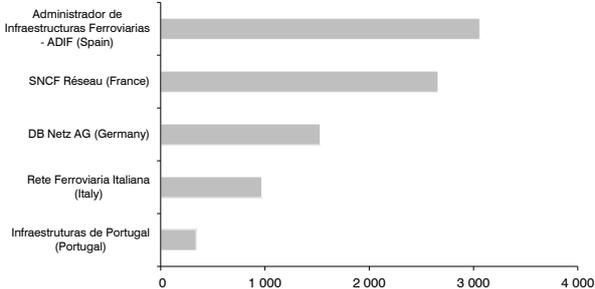
High Speed Rail: Networks by Country (% of Network Length)



Rounded to the nearest 10 km.

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High Speed Rail: Largest Infrastructure Managers (route-km)



Rounded to the nearest 10 km.

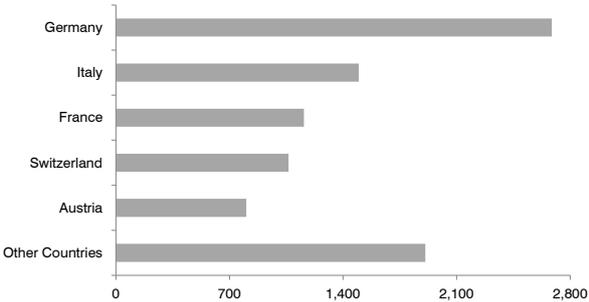
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[...]

1.2 Vehicles

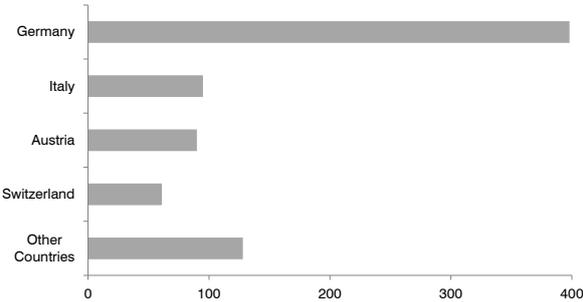
Electric Locomotives

Installed Base / Country (Number of Units)



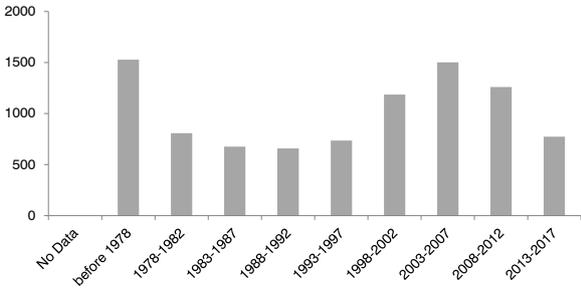
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Delivery 2013 - 2017 / Country (Number of Units)



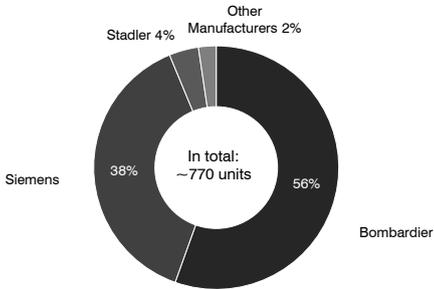
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Installed Base / Age Distribution (Number of Units)



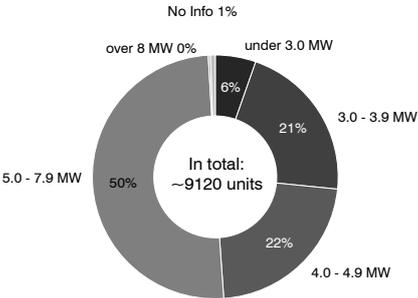
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Delivery 2013 - 2017 / Market Shares (Number of Units)



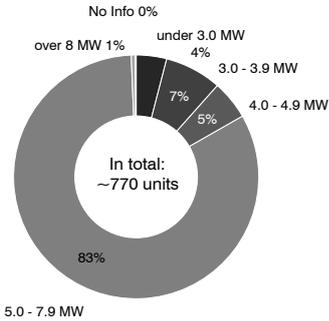
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Installed Base / Power installed (Number of units)



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Delivery 2013 - 2017 / Power installed (Number of units)



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[...]

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