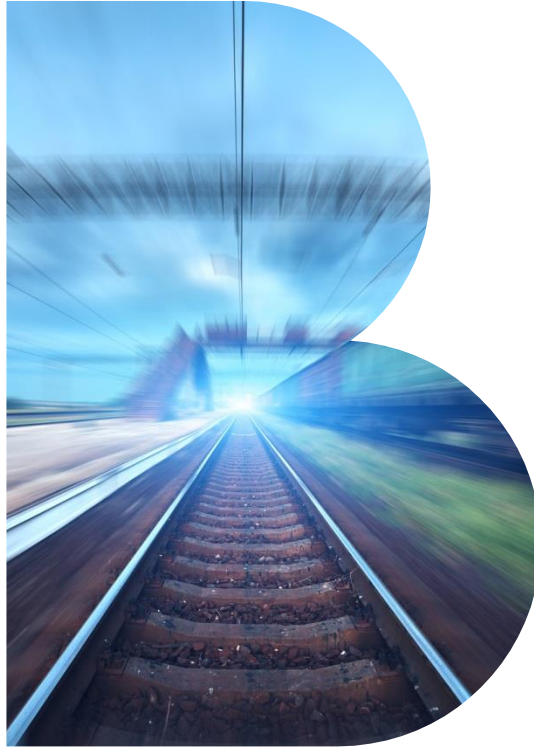


UNIFE World Rail Market Study 2016

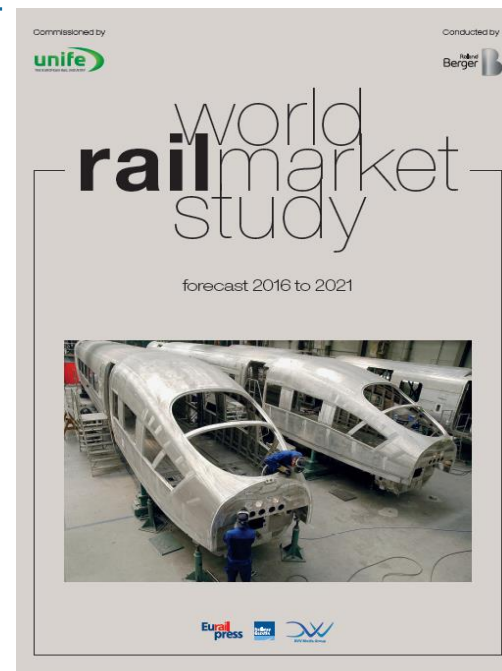
Presentation of highlights



UNIFE and Roland Berger conducted the **sixth edition of the World Rail Market Study**

Key characteristics of WRMS 2016

- Goal of the study is to provide a **comprehensive overview of the rail supply market's development** and to facilitate **communications toward industry stakeholders**
- **Analysis of the current market volume and preparation of a forecast through 2021** – Updated every two years since 2006
- **Methodology** and most assumptions **unchanged** to guarantee consistency with previous studies – **Five additional focus countries**¹⁾ included in this study to further improve data accuracy
- **Adjustment of accessibility rates** to better reflect the market situation (mainly in **Asia Pacific** and in the **services segment**)



1) Oman, Peru, Senegal, Serbia, Slovakia

The study provides a comprehensive overview and **key insights on all relevant developments** in the rail supply market

Content of World Rail Market Study 2016



Installed base –

Detailed information on the installed base of rolling stock and infrastructure



Current market –

Comprehensive assessment of current market volumes on regional levels for all product segments



Future market –

Detailed forecast of market volumes 2019-2021 on regional levels for all product segments



A detailed region portrait –

In-depth coverage of the rail market in Sub-Saharan Africa



Two strategic topics –

Digitalization as enabler of intermodal mobility and the impact of the Fourth Railway Package on the rail supply market



Methodology, accessibility –

Consistent methodology, but consideration of accessibility changes for European suppliers in several regions

Asia Pacific is the biggest driver of the installed base growth – VHS rolling stock segment with the highest growth rate of **6.2% CAGR¹⁾**

Development of installed base [2015 over 2013]¹⁾



Vehicles (excl. freight cars)

- > Increased by about 28,000 units
- > 65% of growth in EMU and metro vehicle segments
- > Growth mainly stemmed from Asia Pacific (80% of delta) – Eastern Europe decreased slightly



Track-km

- > Grown by more than 25,000 km
- > Largest increase recorded in urban systems and VHS track (3,200 km and 9,600 km resp.)
- > China greatest contributor to the growth of VHS track (6,300 km)



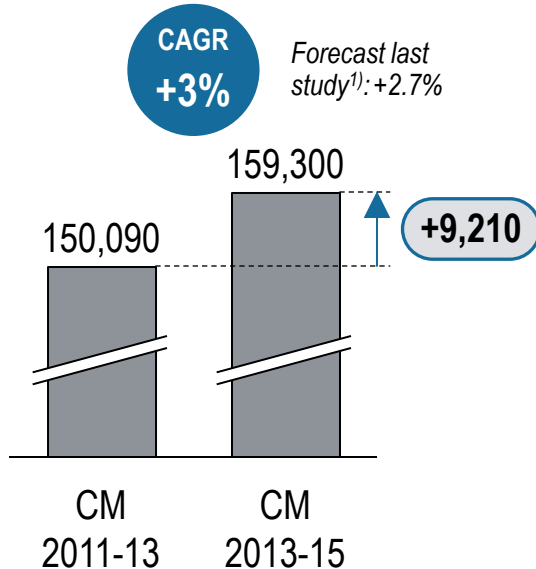
Freight cars

- > 88% of the total ROS installed base (vehicles incl. freight cars)
- > Grown by 2.5% CAGR over the past two years
- > Largest increase of freight cars in NAFTA (83% of delta)

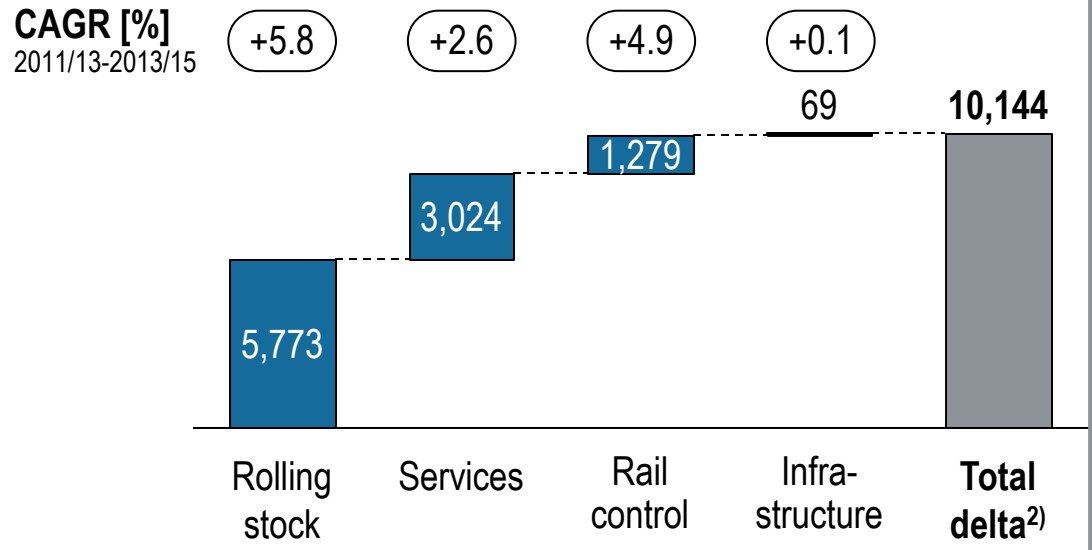
The **market outgrew the forecast** and reached a **CAGR of 3.0%** in the last two years – Rolling stock is the main contributor

Comparison of worldwide total market volume WRMS 2016 vs. 2014 [EUR m]

Market volume p.a.



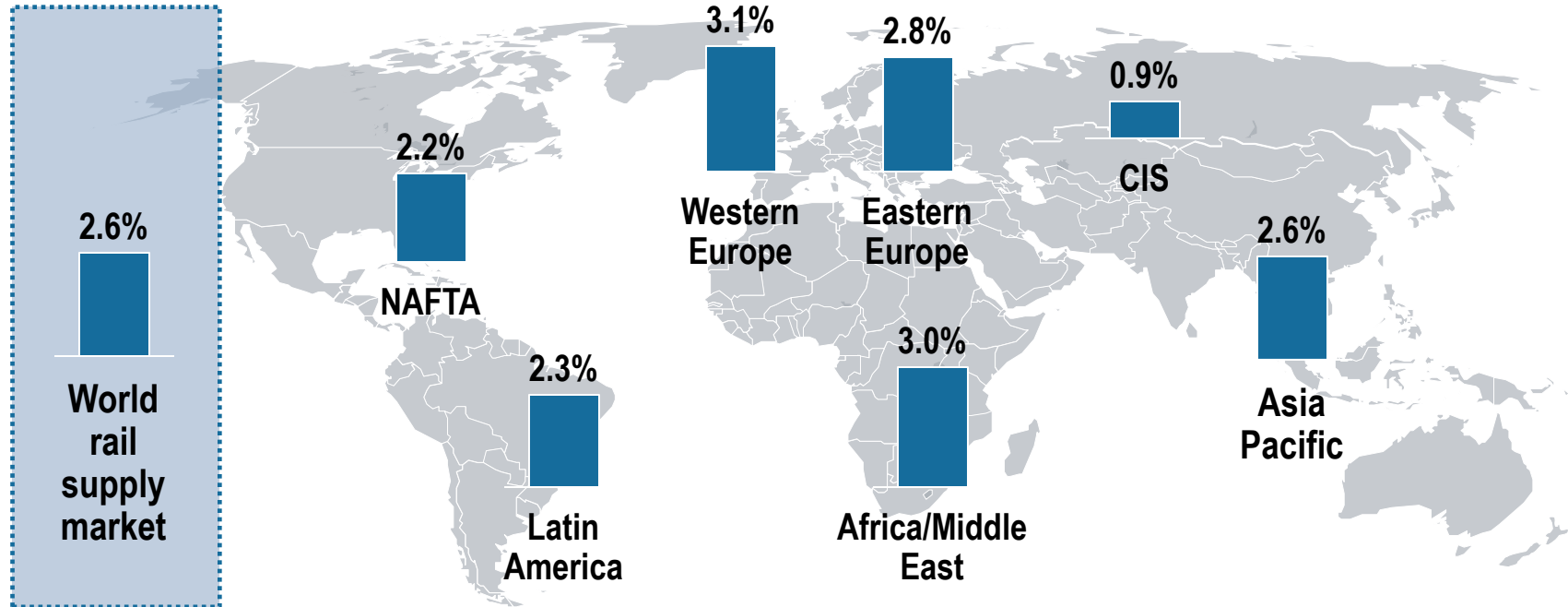
Delta in key segments [without turnkey management]



1) Forecasted annual growth rate in WRMS 2014 2) Difference of EUR 934 m (10,144 - 9,210) between left and right chart due to leaving out turnkey management on the right-hand chart

Western Europe and Africa/Middle East are expected to show **strongest growth** rates – Asia Pacific to remain at high levels

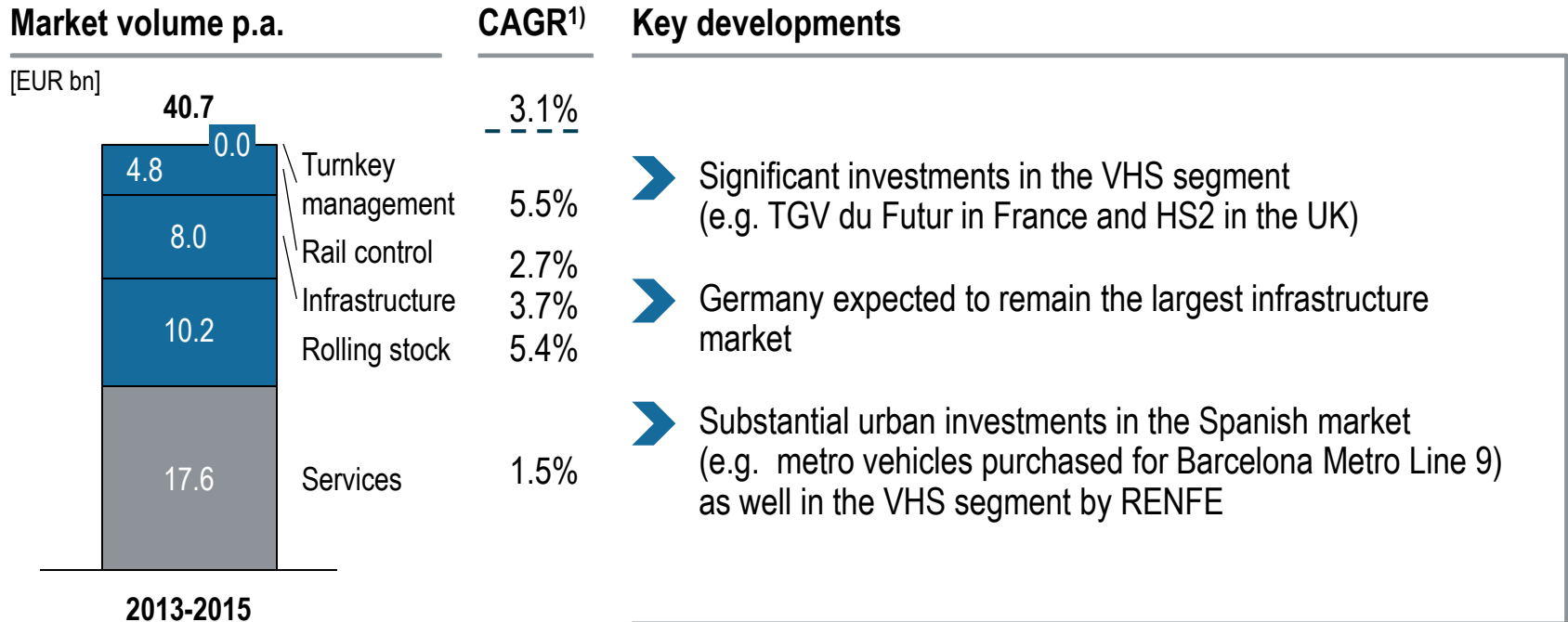
Total market growth rates per region [CAGR¹⁾, %]



1) Compound annual growth rate 2019-2021 vs. 2013-2015

France, UK and Germany drive the market in Western Europe – Growth expected across **all segments**

Total market development in Western Europe



1) Compound annual growth rate 2019-2021 vs. 2013-2015

France and United Kingdom will invest **significantly in the VHS segment**, contributing to the overall market growth

Main projects in Western Europe (selection)

United Kingdom – HS2

> Construction of a new high speed line to link London with different regional cities

France – TGV du Futur

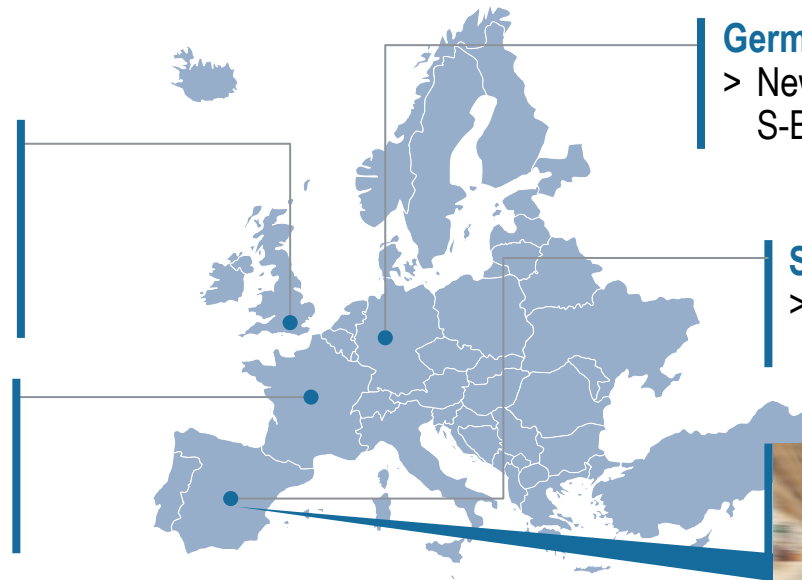
> Orders for new TGV trainsets (~100 new VHS units)

Germany – EMUs (≤160 kph)

> New EMUs (≤160 kph) for the S-Bahn Rhein-Ruhr (~ 140 units)

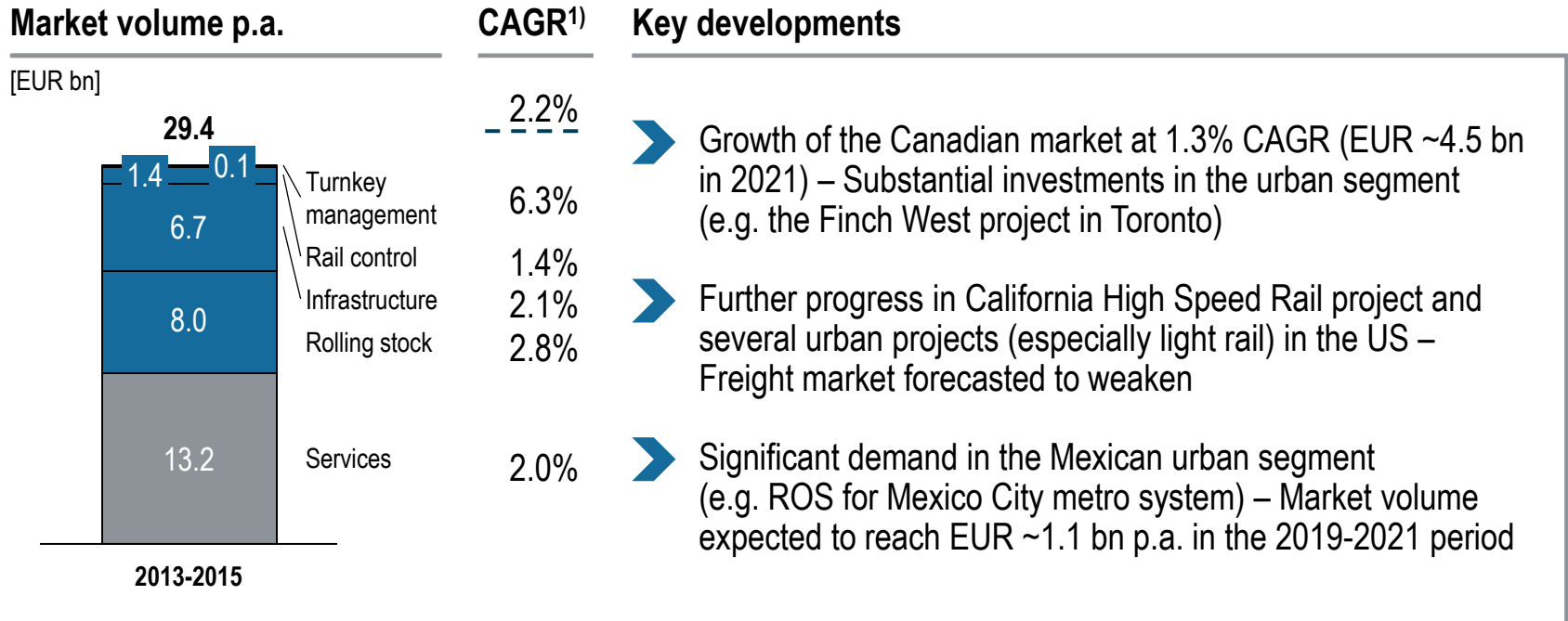
Spain – VHS

> 30 new VHS trainsets ordered by RENFE



Due to **significant investments in VHS and urban** segments, the total market in NAFTA will amount to nearly **EUR 34 bn in 2021**

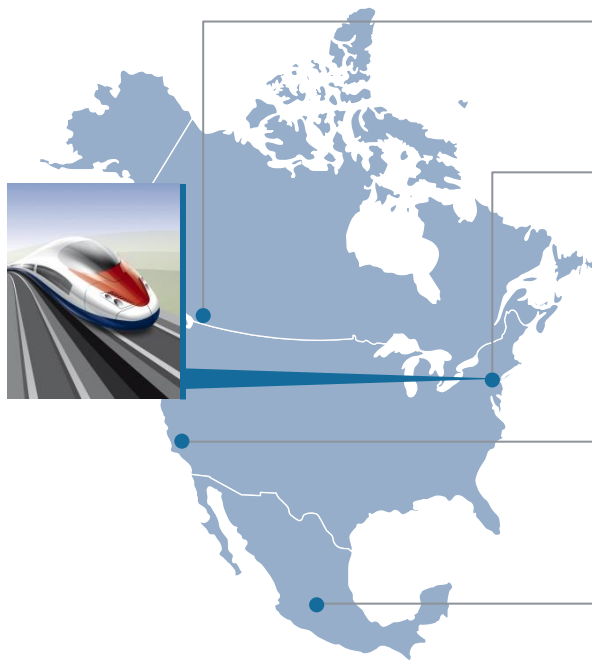
Total market development in NAFTA



1) Compound annual growth rate 2019-2021 vs. 2013-2015

Various urban projects expected to be ordered in Canada – US high speed rail predicted to gather pace

Main projects in NAFTA (selection)



Canada – Surrey Light Rail System

- > Network containing three light rail lines starting from the Surrey Central Skytrain station and transit hub

USA – Northeast corridor

- > New orders for HS trains by Amtrak for the Northeast corridor (NEC)
- > 28 trainsets expected to be purchased

USA – California HS rail

- > Further progress of planned network, initial ROS orders expected

Mexico – Mexico City Metro System

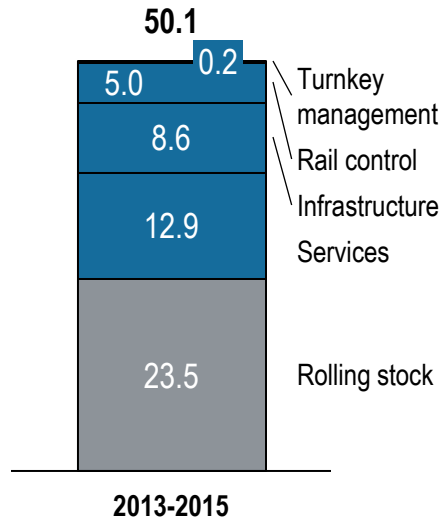
- > Supply of 15 new metro vehicles for Mexico City Metro System Line 1

The market in Asia Pacific is predicted to show **substantial growth** in the future at **2.6% CAGR**

Total market development in Asia Pacific

Market volume p.a.

[EUR bn]



CAGR¹⁾

2.6%
2.1%
3.0%
2.8%
6.2%
0.2%

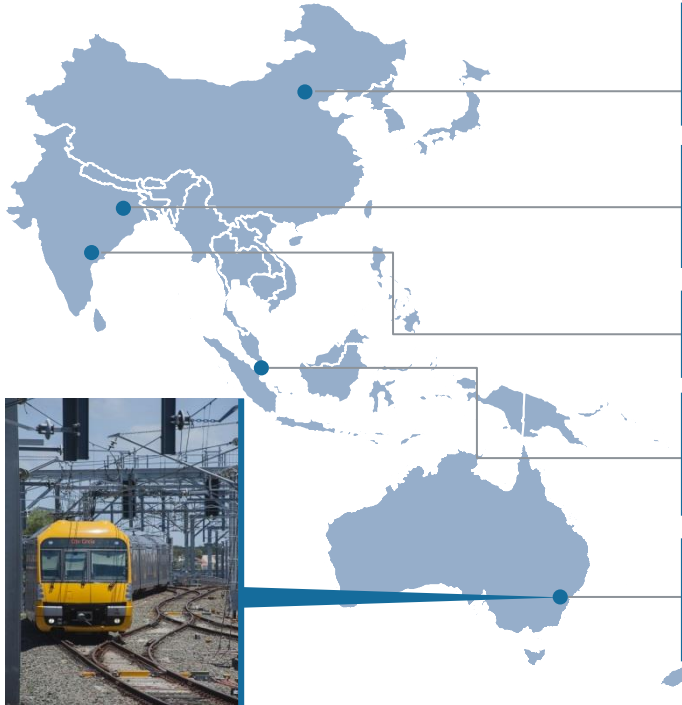
Key developments

- The Indian rail supply market is expected to increase significantly in the future (~EUR 11.2 bn in 2021) – High project volumes in the interurban segment (e.g. the Western and Eastern dedicated freight corridors, the Kanchrapara EMU project, etc.)
- Chinese demand expected to grow at 3.7% CAGR – Various projects in the urban segment (e.g. Zhengzhou Metro extension)
- Largest contribution to the market increase stems from the services segment (+ ~EUR 6 bn 2019-2021 vs. 2013-2015)

1) Compound annual growth rate 2019-2021 vs. 2013-2015

Singapore-Kuala Lumpur high speed line expected to progress in the coming years – Notable projects planned in **India**

Main projects in Asia Pacific (selection)



China – Metro vehicles

- > New metro vehicles for various urban systems (e.g. ~550 vehicles for Beijing Metro)

India – Dedicated freight corridor

- > Construction and upgrading of six freight corridors throughout the country

India – Kanchrapara EMU project

- > Procurement of multiple units worth up to EUR 5 bn

Singapore – HS train

- > Construction of high speed train line to connect Kuala Lumpur in Malaysia and Singapore

Australia – EMUs (≤ 160 kph)

- > Purchase of new EMUs (≤ 160 kph) by Transport for NSW (~ 400 units)

The markets in **Africa/Middle East** are expected to **resume growth** in the long run following a short-term decline

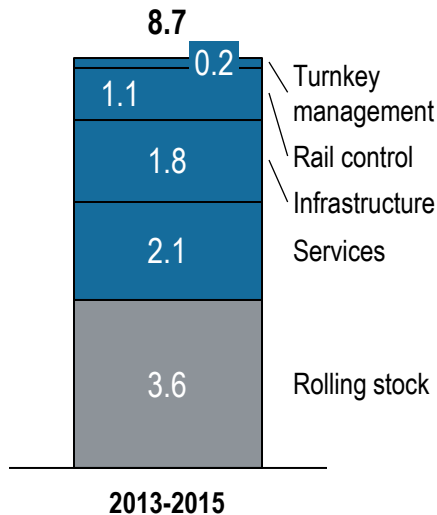
Total market development in Africa/Middle East

Market volume p.a.

CAGR¹⁾

Key developments

[EUR bn]



- 3.0%



Substantial increase in the long run following a decline in the short term – Projects with high uncertainty (e.g. Iraq) are not reflected in the forecast (more growth potential in the future)

4.8%



Growth of the infrastructure market at 5.3% CAGR – Various planned projects in the urban segment in Iran (e.g. new lines for Tehran Metro) and United Arab Emirates (e.g. Dubai Metro Route 2020)

3.3%

5.3%

6.1%

-0.7%



The South African market is expected to drop significantly due to high current volumes (e.g. fleet renewal program launched by PRASA and the large locomotive purchase of Transnet in the 2013-2015 period)

1) Compound annual growth rate 2019-2021 vs. 2013-2015

In **Africa/Middle East**, large infrastructure projects are planned in the **urban segment**

Main projects in Africa/Middle East (selection)

Egypt – Cairo Metro

- > Modernization of Cairo Metro Line 1 as well as new orders for metro vehicles

Saudi Arabia – Jeddah Metro

- > Three-line metro system
- > Target is to achieve public commuter share of 30%¹⁾



Israel – EMUs (≤160 kph)

- > Purchases of more than 450 units by Israel Railways

United Arab Emirates – Dubai Metro

- > Intends to extend the current Red Line from Nakheel Harbour and Tower metro station to the Expo 2020 site



1) Currently stands at 1-2%

All market segments expected to grow – Rolling stock growing slightly slower due to high current volumes

Key developments per product segment and predicted growth rates¹⁾



Infrastructure

Continued extension of VHS infrastructure (e.g. China) and renewal of mainline tracks constitute main demand; strong growth also in urban segment

> 2.8%



Rolling stock

Urban and commuter rolling stock expected to drive demand; locomotives and wagons stay flat due to high current volumes

> 1.9%



Rail control

Continued strong growth across both interurban and urban segments; trend toward CBTC and ERTMS technologies expected to stay stable

> 2.9%



Services

Growing installed base and increasing services outsourcing by rail operators drive services market upward

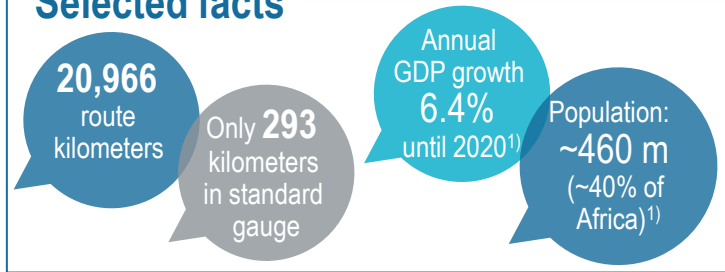
> 2.9%

1) Compound annual growth rate of total market 2019-2021 vs. 2013-2015

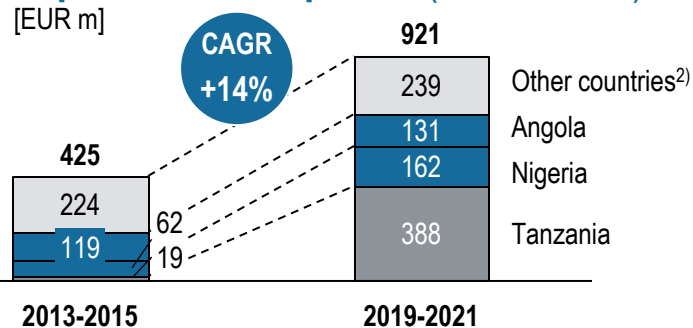
We expect the market in Sub-Saharan Africa to grow fast – There are three key **success factors** for doing business in this region

Region portrait: Sub-Saharan Africa

Selected facts



Expected development (total market)



Key success factors

- Adapted product/services portfolio**
 - > Affordability of the product and compliance with local functional requirements
 - > Provision of maintenance
- Turnkey capabilities**
 - > Providing all components and services
 - > Combining European know-how with local workforce
- Financing provision**
 - > Helping the local countries to secure the required funds for the projects
 - > Understanding the risks associated with the local capital markets

1) Source: The World Bank, 2015 2) Ethiopia, Ghana, Kenya, Mozambique

Through its technical and political pillars, the Fourth Railway Package will increase **harmonization** and **liberalization** of the European rail market

Overview of the Fourth Railway Package

Technical pillar

'Simplified vehicle authorization and safety certification for operators'

European Railway Agency as one-stop shop for rail suppliers and operators	Widespread implementation of harmonized signaling system ERTMS
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Political pillar

'A structure that delivers'

Reinforcement of infrastructure managers

'Opening domestic passenger markets'

Mandatory public tendering and non-discriminatory access to rolling stock

'Maintaining a skilled rail workforce'

Mandatory take-over of public services workforce



The overall goal of the package is to create a fully open domestic passenger transport market by 2019 through the establishment of a single European railway area

Digitalization leads to an **improved transport experience**

Effects of digitalization on the transportation market

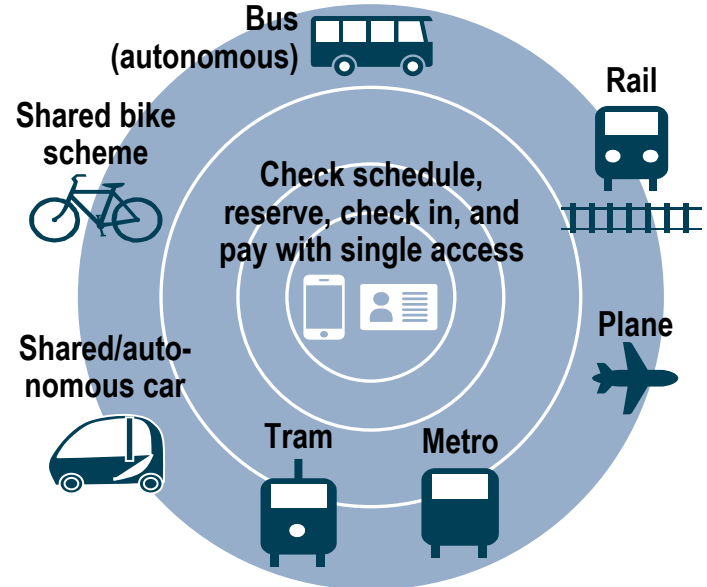
A Direct effects

- > Customer centric approach due to digital applications allowing intermodal planning, booking, and payment
- > Enhanced traffic management systems combined with connected equipment enable more flexible and coordinated transport

B Indirect effects

New business models and disrupting technologies influence transportation, e.g. shared economy and autonomous vehicles

Seamless intermodal transport



Need for action of decision makers – Further reduction of accessibility for European suppliers should be avoided

European rail industry's challenges

Current status

- Reduced accessibility and visibility of certain markets for European suppliers (e.g. share of foreign bidders in the Japanese ROS market ~0.25%) – Total accessibility declined from 68% to 63%
- Nearly half of the accessible global rail market for rail equipment supplied by the European rail industry
- European rail market is becoming more liberalized and open to foreign suppliers

Consequences of current trend

- Continuous exclusion of European bidders from certain markets (e.g. China, Japan, etc.)
- Decreasing accessible market for European rail suppliers
- Continuous expansion of non-European rail suppliers and stronger presence in Europe

Various actions should be undertaken by decision makers to create a level playing field and to protect the interests of the European rail industry

Summary: The **rail industry will continue its growth** driven by demand, innovation and legislation

Conclusion



- **Stable growth of the industry will continue**
- **Growth in all continents and all product segments**
- **Megatrends continue to drive demand for rail transport**
- **Digitalization is a chance rather than a challenge**
- **Fourth Railway Package facilitates rail business**
- **Mixed development of accessibility: Asia difficult, services segment improving**

Roland
Berger

