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HIGHSPEED RAIL TRANSPORT – GLOBAL MARKET TRENDS

Forecast, Installed Base, Manufacturers,
Infrastructure and Rolling Stock Projects

2025



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HIGHSPEED RAIL TRANSPORT – GLOBAL MARKET TRENDS

Forecast, Installed Base, Manufacturers, Infrastructure and Rolling Stock Projects

Hamburg, April 2025

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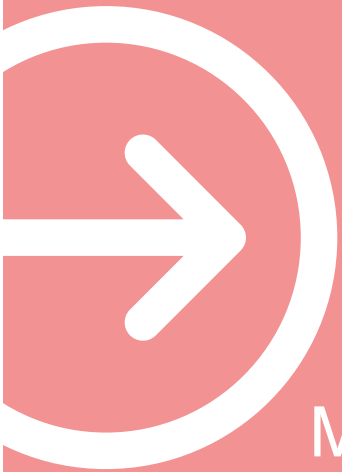
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1

Executive Summary



Market Dynamics, Innovations and
Emerging Strategic Opportunities
Worldwide

1

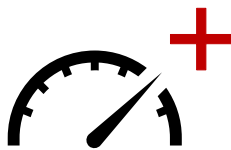
Technological Innovations
and Strategic Trends in Very
High-Speed Rail

Technological Innovations and Strategic Trends in Very High-Speed Rail

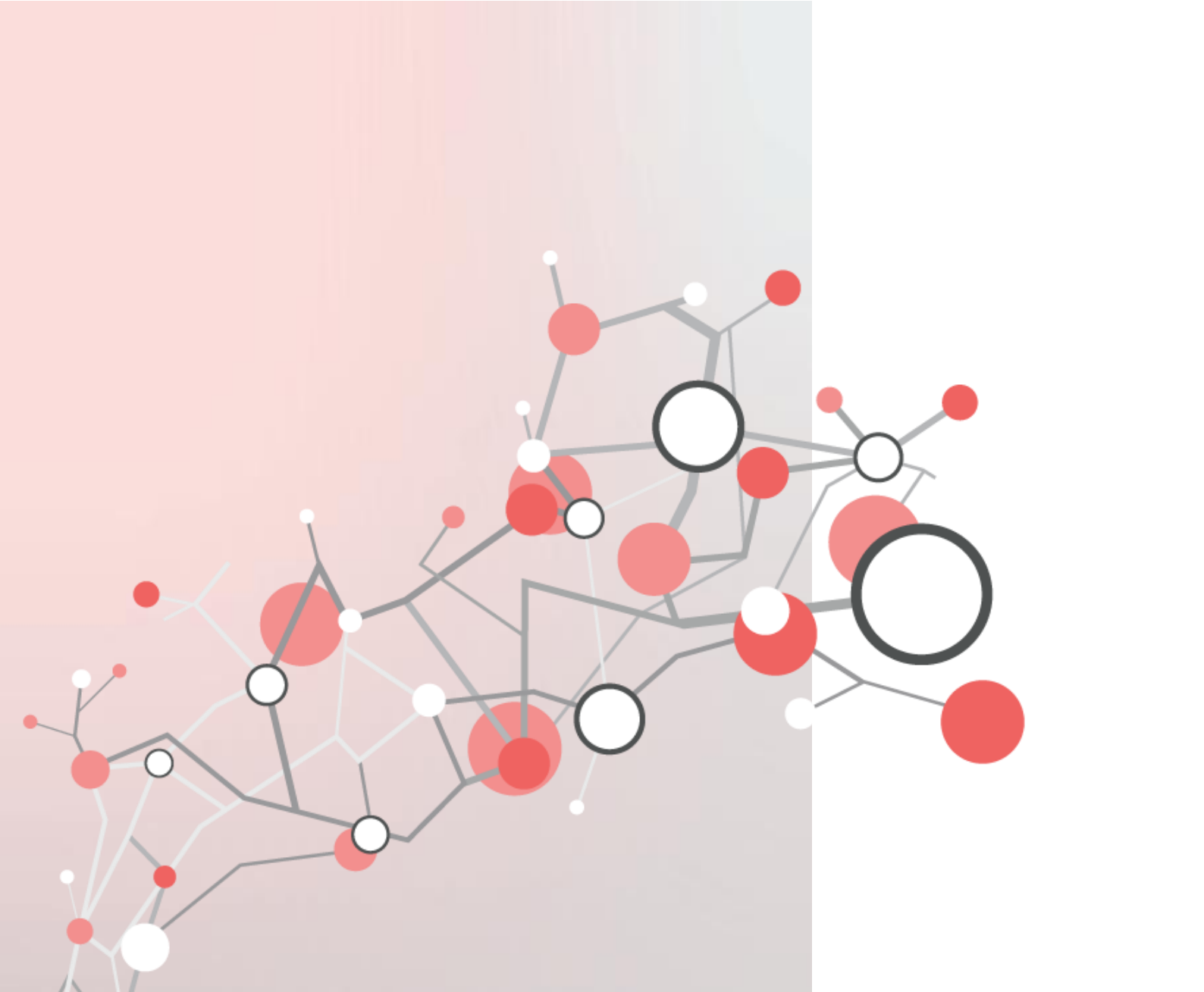
Over the last few decades, the global High-Speed Rail market has consistently pushed for higher operational speeds, positioning itself increasingly as a competitive alternative to air travel. Technological advancements, particularly in rolling stock, have enabled significant speed enhancements, whereas infrastructure capable of supporting very high-speed travel (VHST, >300 km/h) has long been feasible, albeit financially demanding.

Manufacturers play a critical role in enabling higher speeds through continuous innovation. E.g., CRRC's latest CR450AF train, China's new flagship VHST model, epitomises the latest high-speed technology. Designed for a top speed of 450 km/h and an operational speed of 400 km/h, the CR450AF incorporates substantial aerodynamic improvements, weight reductions by approximately 10%, and enhanced braking systems enabling it to safely decelerate from 400 km/h in distances previously required for stopping at 350 km/h. Advanced intelligent systems within the new train further underline China's clear strategy towards technological leadership in the global VHST sector.

[...]



Over the last few decades, the global High-Speed Rail market has consistently pushed for higher operational speeds, positioning itself increasingly as a competitive alternative to air travel



2

The market for HSR vehicles in Europe

2 Europe

2.1 Total Market

2.1.1 Market Overview



Europe			
Transport market	Performance (Pkm billion)		CAGR (2024-33)
	2024	2033	
Total			
Infra-structure	Network-Length (km)		CAGR (2024-35)
	2024	2035	
Total			
Fleet	Size (cars)	Avg. age (years)	Trend (2024-35)
IHST			→
HST			↗
VHST			↗
Total			↗
OEM	Market volume (EUR million)		CAGR (2024-35)
	2024	2035	
Total			
After-sales	Market volume (EUR million)		CAGR (2024-35)
	2024	2035	
Total			

Europe’s high-speed rail market stands at a pivotal moment of transformation. With an estimated transport performance of nearly XXX billion passenger-kilometres in 2024, the continent has developed one of the most mature and extensive high-speed networks on a global scale. Transport performance is projected to rise to XXX billion pkm by 2035, driven by strong infrastructure expansion, changing mobility preferences, political support, fleet renewals and growing international competition.

Until recently, HSR markets in Europe were largely nationally segmented and dominated by state-owned incumbents. The liberalisation of rail markets—initiated by EU transport policy and reinforced through successive railway packages—is gradually reshaping this structure. While progress remains uneven, Spain and Italy have emerged as key reference markets for open access competition. In Spain, Renfe, Ouigo (SNCF), and Iryo (Trenitalia) are now actively competing on key corridors. In Italy, Italo has successfully challenged Trenitalia for over a decade, establishing a precedent for liberalised HSR operation. France is currently transitioning into a more open model, with several new operators, such as Proxima, Le Train and Kevin Speed, preparing market entry. In contrast, Germany continues to be dominated by Deutsche Bahn, although international services are beginning to diversify, and first private initiatives are emerging. In the United Kingdom, high-speed services remain fragmented, with limited true HSR offerings and the major expansion project HS2 not expected to contribute to market growth until after 2033.

The liberalisation process is closely linked with a broader trend towards internationalisation of services. Operators such as Eurostar, SNCF, Trenitalia, Renfe and DB are increasingly expanding their footprints beyond domestic borders. Projects such as the Mont Cenis Base Tunnel, Brenner Base Tunnel, Fehmarnbelt Link, and Rail Baltica are not only transnational in scope, but also fundamentally alter the strategic reach of European HSR networks. As a result, international connections—previously niche

segments—are becoming more integrated into operators’ growth strategies and are expected to significantly contribute to the overall transport volume by 2035.

Measured by transport performance, the high-speed rail market in Europe is currently dominated by a handful of large national markets. France remains by far the largest contributor, accounting for approximately XX% of the continent’s total HSR transport performance. This dominant position not only reflects the extensive length and density of the French high-speed network, but also the consistently high utilisation rates and growing popularity of affordable offers such as Ouigo. Germany follows with a substantial XX% share. The country’s model, based on high-speed integration within an upgraded conventional network, enables broad geographic reach. Italy ranks third, contributing XX% of total transport performance. With two competing operators and a strong north–south axis linking major cities, the Italian HSR system is well-established. Spain, while having the longest high-speed network in Europe, accounts for X% of total transport performance. The market is characterised by a rapidly evolving competitive landscape and significant network expansion into peripheral regions. The United Kingdom holds an X% share of the market, despite limited domestic high-speed infrastructure. This figure is primarily driven by Eurostar’s Cross-Channel services and high utilisation of Class 800 and Class 390 trains on upgraded conventional routes.

HSR passenger rail transport performance in Europe by country
(in % of pkm; 2024)



Source: UIC, SCI estimation

© SCI Verkehr

Figure 2: Europe: HSR transport performance

[...]

The future development of Europe’s HSR market will be shaped by a convergence of political, technological, and commercial forces. The push for modal shift from air to rail, strong passenger demand, and growing operator diversity create a fertile environment for growth. However, realising this potential will depend on the ability to overcome structural limitations in infrastructure, capacity, workforce, and supply chain reliability.

2.1.2 Infrastructure

Europe's high-speed rail infrastructure is currently defined by a marked regional concentration and a growing trend towards international integration. To date, the majority of dedicated HSR infrastructure remains concentrated in Western Europe, particularly in France and Spain, where extensive networks radiate from capital cities such as Paris and Madrid. In contrast, Germany and Italy feature more decentralised network structures, with hubs also centred around economically pivotal cities such as Frankfurt and Milan, respectively.

HSR infrastructure map Europe (by speed and status)



Source: UIC, SCI Database

© SCI Verkehr

Figure 3: Europe: HSR infrastructure network

Despite national differences, a clear trend is emerging towards greater international connectivity. A growing number of cross-border infrastructure projects aim to establish a trans-European high-speed network and position rail as a viable alternative to short-haul air and road transport. Key examples include the Lyon–Turin and Brenner Base tunnels (France–Italy and Austria–Italy), the Fehmarnbelt Tunnel (Germany–Denmark), and ongoing corridor upgrades across Germany, Switzerland and Austria. These projects are expected to become critical enablers of cross-border traffic by the early 2030s.

Southern Europe is also reinforcing its contribution to the European network. Italy and Spain are expanding key axes to improve domestic capacity and cross-border reach—particularly towards the French borders, Central Europe and Portugal. While in Northwestern Europe, projects such as HS2 in the UK, the CCS upgrade of the Channel Tunnel, and the new Eurostar terminal in Amsterdam reflect efforts to integrate with the continental system and modernise international gateways. Beyond the EU, Turkey is advancing a nationwide high-speed strategy, with ongoing projects aimed at connecting major cities and extending links towards the EU border. In the long term, Turkey may emerge as a key interface between the European and Asian high-speed rail systems.

[...]

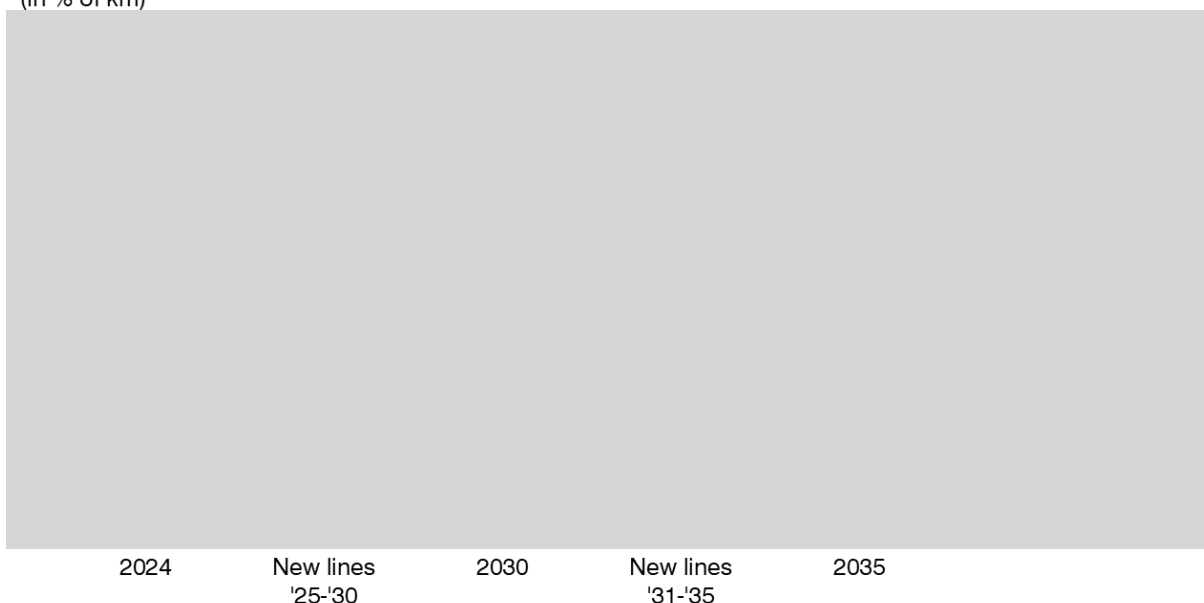
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The current European high-speed rail network comprises nearly XXkm, with Spain accounting for the largest share at approximately XX%. France and Germany each contribute over XX%, although their network profiles differ: France stands out for its high proportion of VHSR infrastructure, supporting operational speeds of 300 km/h and above.

[...]

HSR infrastructure in Europe by country

(in % of km)



Source: UIC, SCI estimation; Prognosis: SCI Verkehr

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Figure 4: Europe: HSR infrastructure development

Several non-focus European countries are currently advancing or planning HSR infrastructure as part of broader efforts to enhance regional integration and align with the EU’s TEN-T Core Network (established HSR markets are described in more detail in the respective chapters).

[...]

Project title	Distance in km	Max. speed (km/h)	(Expected) completion	Project status
Évora - Caia	80	250	2025	Under construction
Estonian border - Lithuanian border	230	249	2026	Under construction
Estonian border - Lithuanian border	67	249	2027	Under construction
Prague - Poříčany (- Hradec Králové)	29	320	2028	Planning
...				

2.1.3 Fleet

Europe – Fleet segmentation of the installed base 2024				
Segment	Fleet size (units)	Fleet size (cars)	Cars per unit (average)	Average fleet age (years)
IHST
HST				
VHST				
Total				

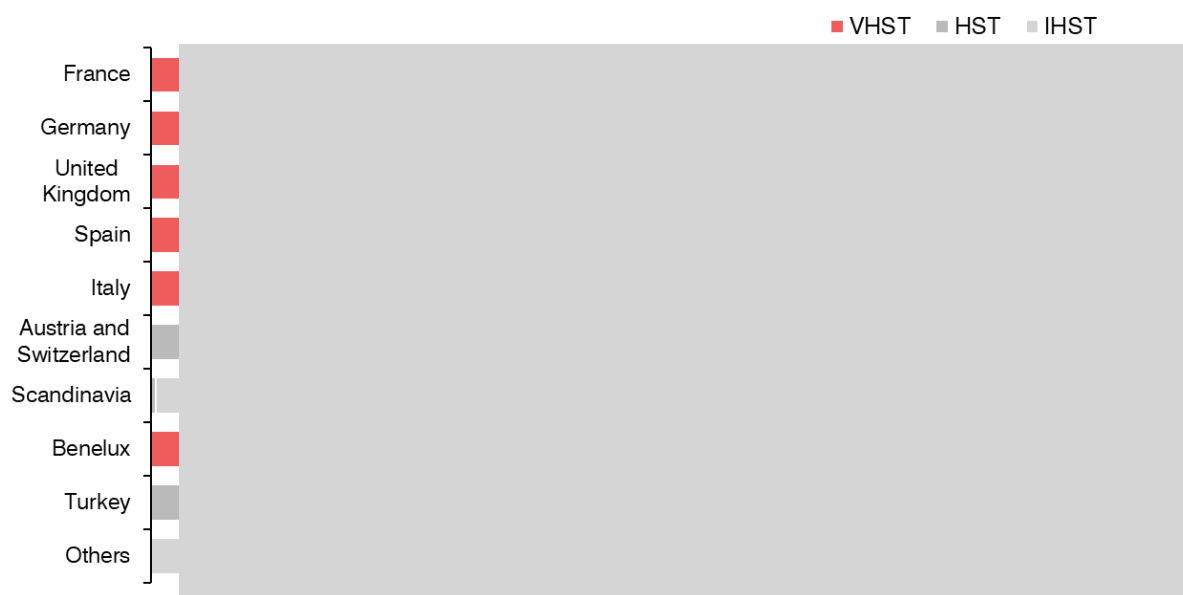
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The largest share of the fleet—around XX%—is made up of I-HSTs. These are predominantly deployed in regions where infrastructure constraints do not support higher speeds, such as the United Kingdom, the Nordic countries, and smaller markets in Benelux and the Alpine region. In these areas, I-HSTs offer a suitable balance between speed, network compatibility, and operational flexibility.

V-HSTs account for just over one-third of the European fleet. They are mainly concentrated in countries with dedicated high-speed infrastructure capable of supporting operations at 320 km/h, especially France, followed by Spain, Italy, and Germany. These trains are also used extensively in international services, such as Eurostar and cross-border operations between France, Belgium, Germany, Italy, and Switzerland. Their deployment supports growing demand for fast long-distance connections and is increasingly central to modal shift strategies.

HSTs form the remaining share of the fleet and are especially prevalent in Germany, Spain, Italy, and parts of France, Switzerland, and Turkey. In Germany, for example, HSTs such as the ICE 4 have been optimised for a network where maximum speeds above 250 km/h are rare. These trains serve both core high-speed corridors and upgraded conventional lines.

HSR-Fleet in Europe by country and speed
(cars; 2024)



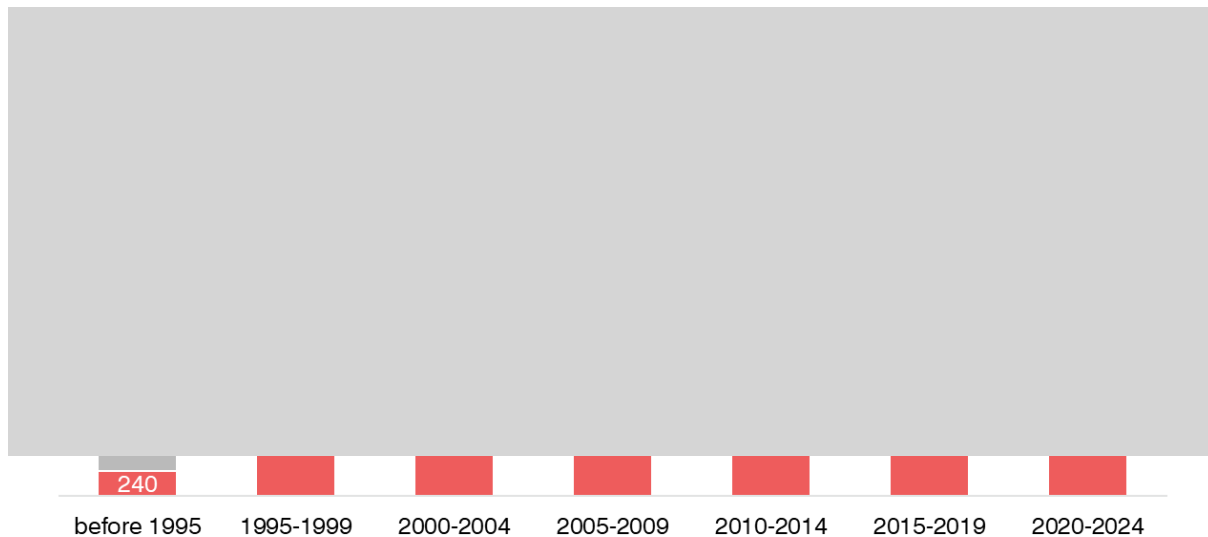
Source: SCI Database

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Figure 5: Europe: HSR fleet per country

[...]

Age distribution in Europe by speed
(21,150 cars; 2024)



Source: SCI Database

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Figure 6: Europe: Age distribution of HSR fleet

Beyond the major Western European countries, several smaller or emerging markets are also building or expanding their HSR fleets. Poland, with a growing network and established operations on conventional and upgraded lines, already maintains a sizeable HST and I-HST fleet and is expected to invest further in new rolling stock under the CPK programme. Czechia has a small number of I-HSTs in service and is preparing for future fleet expansion linked to its first dedicated high-speed corridor.

[...]

2.1.4 Manufacturers

The European high-speed rail rolling stock market is characterised by a small number of dominant manufacturers and a growing group of niche and regional suppliers. Over the past five years, vehicle deliveries have been concentrated among three major players, but the order books for the next decade indicate a gradual diversification in market structure.

Market shares per manufacturer in Europe from 2020-2024 (in % of cars)



Source: SCI Database

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Figure 7: Europe: Market shares of manufacturer HSR deliveries

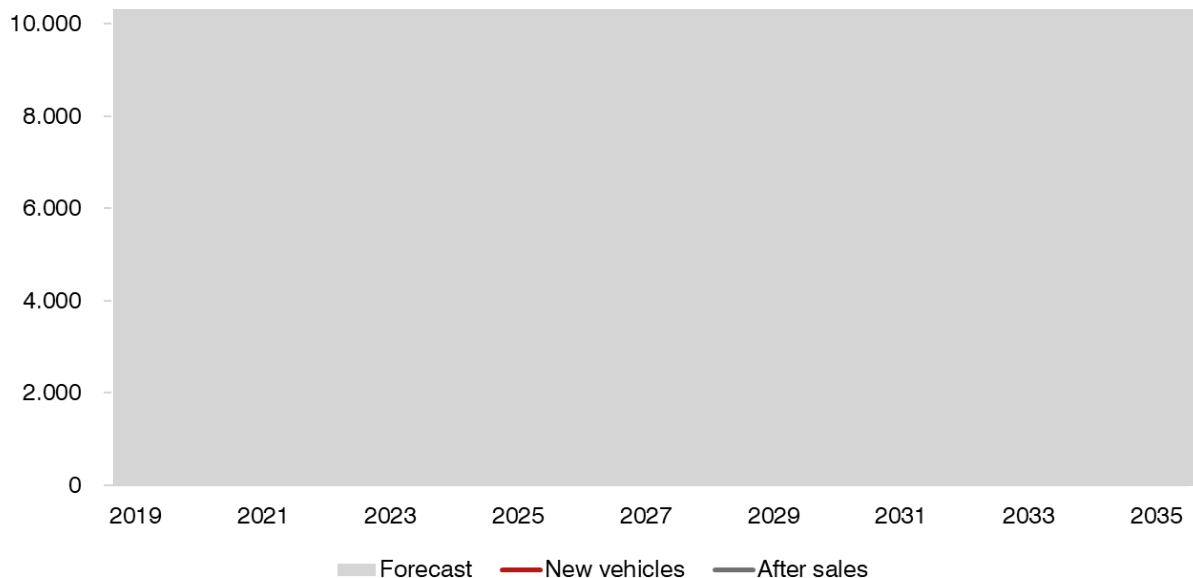
[...]

Manufacturer	Activity (Brief description)	Cars delivered
Alstom
Siemens		
Hitachi		
Stadler		
Talgo		
CAF		

2.1.5 Market Volume & Development

Market Volume in Europe

(in EUR million)



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Figure 8: Europe: Market volume forecast

OEM Market

The European OEM market for high-speed rolling stock remains one of the most dynamic segments of the rail supply industry, driven by simultaneous trends of fleet renewal, infrastructure expansion, and market liberalisation. In total, the OEM market for high-speed trains in Europe currently amounts to EUR XX billion annually, increasingly spreading to emerging HSR regions.

[...]

After-Sales Market

The European after-sales market for high-speed rolling stock is experiencing dynamic growth, shaped by three overarching factors: The ageing of first-generation fleets, the continuous expansion of newer train series, and rising passenger volumes across the continent. In recent years, the total market volume has grown steadily and is expected to exceed EUR XX billion annually by the early 2030s, supported by increased refurbishment activity, technological upgrades, and capacity expansions in maintenance infrastructure.

[...]