Rail transportation

Importance

- Rail transportation refers to the **movement on guideways** (rails, also known as tracks, monorails, magnetic levitation).
- Rail transportation has been the product of the industrial era, playing a major role in the **economic development** of Western Europe, North America and Japan
- It represents a **major improvement in land transport technology**
- This was not necessarily because of its capacity to carry heavy loads, since maritime transportation excelled at doing so, but because of its **higher level of ubiquity and its speed**.
- Rail transport systems dramatically improved travel time as well as the possibility to offer **reliable and consistent schedules** that could be included in the planning of economic activities such as production and distribution.

Technical features

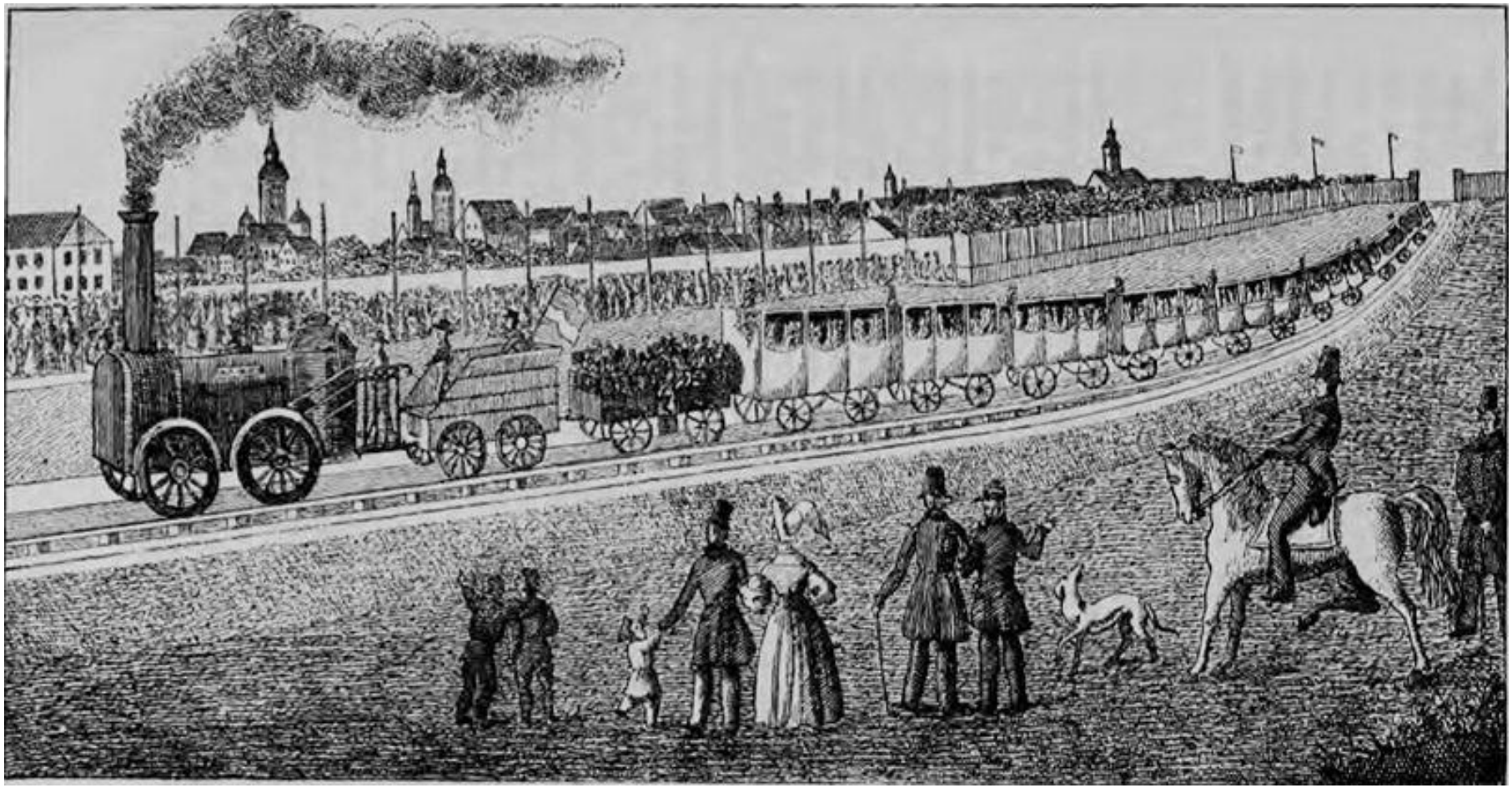
- rail vehicles (rolling stock)
- Track ballast forms the trackbed upon which railroad ties (sleepers) are laid.

Good quality track ballast is made of crushed stone. The sharp edges help the particles interlock with each other.

Track ballast

Track ballast (close up) between railway sleepers and under railway track

Passengers



Although primitive rail systems existed by the 17th century to move materials in quarries and mines, it is not until the early 19th century that the first real rail transportation systems came into existence.

Un treno attraversa un ponte sulla linea transamericana, trainato da due locomotive di tipo 4-4-0 American (rodiggio Whyte) e con al seguito alcune carrozze Pullman. È il 1860.


Treno5
TRENITALIA

InterCityExpress - Germania

Shinkansen 500 series at Kyoto Station taken by Nick Coutts on 2005-03-19

magnetic levitation train

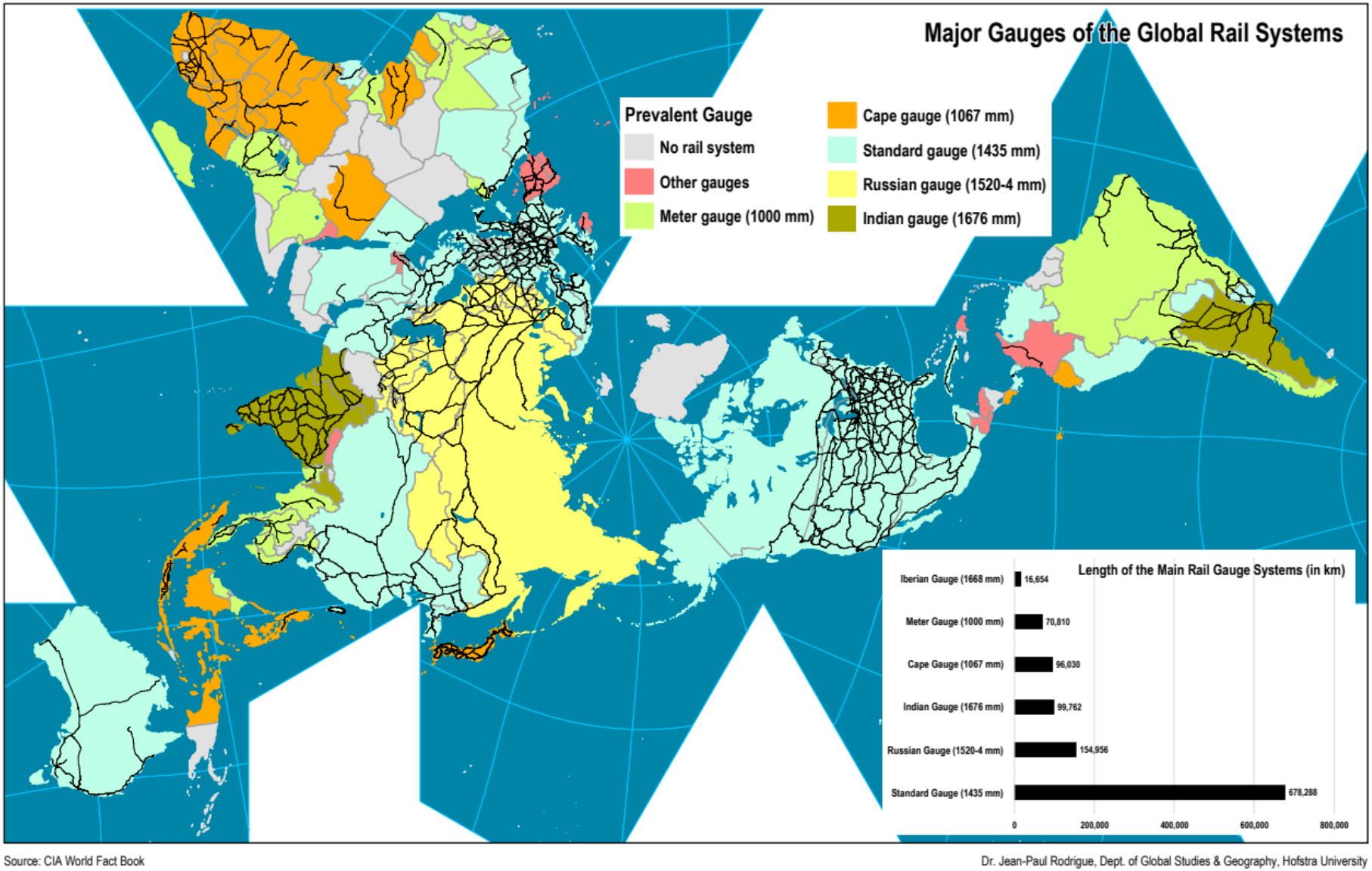
ETR 610

Freight

Track gauge

The track gauge is the spacing of the rails on a railway track and is measured between the inner faces of the load-bearing rails.

They are **heterogeneous across jurisdictions** since because of historical and political reasons, different nations and regions have adopted different gauges. The standard gauge of 1.435 meters has been adopted in many parts of the world, across North America and most of Western Europe for example. It accounts for about 60% of the railways. But other gauges have been adopted in other areas, such as the broad gauge (1.520 meters) in Russia and Eastern Europe accounting for about 17% of the railways. This makes the **integration of rail services complex**, since both freight and passengers are required to change from one railway system to the other. As attempts are being made to extend rail services across continents and regions, this is an important obstacle, as for example between France and Spain, Eastern and Western Europe, and between Russia and China. **The potential of the Eurasian land bridge is impaired in part by these gauge differences**.



https://transportgeography.org/?page_id=1771

Traction

The locomotion technology ranges from **steam** (almost abandoned), to **diesel** (mainly for freight in the United States) and **electric** (mainly for passengers in Europe). More recently, **hydrogen** is used to fuel trains.

Vehicles

- **Rail transportation is very flexible in terms of vehicles and there is a wide variety of them filling different purposes.**
- Among the most common vehicle assets are **open wagons** (hopper cars) used for bulk cargo (e.g. minerals), **box cars** to carry general and refrigerated goods, and **tank cars** to carry liquids.
- **Intermodal transportation** has also permitted the development of a new class of flat railcars that can carry containers and trailers (less common).
- The recent trend has been towards a **specialization of freight wagons**, such as **hopper wagons** (grain, potash and fertilizers), **triple hopper wagons** (sand, gravel, sulfur and coal), **flat wagons** (wood, agricultural equipment, manufactured goods, containers), **tanker wagons** (petrochemical products), **box wagons** (livestock, paper, manufactured goods, refrigerated goods), **car wagons**.

List of railway vehicles

https://en.wikipedia.org/wiki/List_of_railway_vehicles

Freight use [edit]

Container use [edit]

- Boxmotor
- CargoSprinter
- Conflat
- Double-stack car
- Megafret

Bulk freight [edit]

- Boxcar (US)
- Centerbeam cars
- Covered hopper
- Covered wagon (UIC)
- Double door boxcar
- Flatcar
- Gondola (rail) (US)
- Goods wagon
- Hicube boxcars
- Hopper car
- Open wagon (UIC)
- Refrigerator car (US)
- Refrigerated van (UIC)
- Tank car (US), Tank wagon (UIC)

Specialist use [edit]

- Aircraft parts car
- Autorack
- Coil car (rail)
- Lowmac
- Mineral wagon
- Quarry tub
- Schnabel car
- Slate wagon
- Stock car (rail)

Multi-modal [edit]

- Intermodal car
- Modalohr Road Trailer Carriers
- Roadrailer
- Well car

Carri per il trasporto di merci

- Esistono normalmente nelle versioni a 2, a 3 e a 4 assi con la stessa tipologia ma portata diversa.
- Carro per merce varia
- Carro aperto tipo K
- Carro per merce lunga, aperto in alto, eventualmente accessoriato con sponde di varia altezza o con piantoni fermacarico.
- Carro a temperatura controllata tipo "INTERFRIGO".
- Carro a tramoggia.
- Carro cisterna
- Carro silo. Come per il precedente ma per merci polverose e granulari, anche in questo caso, per la maggior parte, di proprietà privata.
- Carro bisarca
- Carro porta-container
- Carro ultrabasso.
- Carro siluro o carro siviera. Contenitori a forma allungata rivestiti internamente di materiale refrattario, all’interno dei quali viene colata la ghisa fusa per il trasferimento in acciaieria.

Boxcar

A boxcar is a North American railroad car that is enclosed and generally used to carry freight. **The boxcar, while not the simplest freight car design, is probably the most versatile, since it can carry most loads**. Boxcars have side doors of varying size and operation, and some include end doors and adjustable bulkheads to load very large items.

Carro per merce varia, chiuso, con porte laterali di carico e scarico. È il carro ferroviario per antonomasia e contemporaneamente quello da più tempo in circolazione; nella sua versione più grande a 4 assi ha una lunghezza di circa 20 m, una superficie di carico utile di 53 m^2, un volume che raggiunge i 135 m^3 ed una portata netta che può arrivare ai 50.000 kg. Recentemente hanno cominciato a diffondersi anche i vagoni con pareti laterali scorrevoli in sostituzione delle porte centrali fisse, migliorando la capacità di carico e scarico delle merci su pallet.

Covered goods wagon

Swiss (SBB) Hbbillns sliding wall wagon, a present-day standard for palettised goods with lockable and movable partitions

Economic Fork Lift With Diesel E...

Gondola Car

A gondola is an **open-topped rail vehicle used for transporting loose bulk materials**. Because of their low side walls gondolas are also suitable for the carriage of such high-density cargos as steel plates or coils, or of bulky items such as prefabricated sections of rail track.

Hopper car

A hopper car is a type of railroad freight car used to transport loose **bulk commodities such as coal, ore, grain, and track ballast**. Two main types of hopper car exist: **covered hopper cars**, which are equipped with a roof, and **open hopper cars**, which do not have a roof. This type of car is distinguished from a gondola car in that it has opening doors on the underside or on the sides to discharge its cargo. The development of the hopper car went along with the development of automated handling of such commodities, with automated loading and unloading facilities.

Covered hopper cars are used for bulk cargo such as grain, sugar, and fertilizer that must be protected from exposure to the weather. Open hopper cars are used for commodities such as coal, which can suffer exposure with less detrimental effect. Hopper cars have been used by railways worldwide whenever automated cargo handling has been desired.

covered hopper

A covered hopper is a railroad freight car designed for carrying dry bulk loads, varying from grain to products such as sand and clay.

Carro silo. Come per il precedente ma per merci polverose e granulari, anche in questo caso, per la maggior parte, di proprietà privata.

Carro a tramoggia. Consente il carico di merci sfuse dall'alto e il loro scarico tramite ribaltamento laterale del vagone stesso. Viene utilizzato per il trasporto di materie prime come ad esempio il carbone.

Carri H21 - H22 [a due assi]

Tipo: Hbbill(n)s
Impiego: carichi palettizzati

Questo carro ha il pavimento in legno di larice ed è dotato di 6 pannelli divisori in lega leggera bloccabili. Le grandi pareti scorrevoli laterali (2 per ogni lato) in lega leggera sono bloccate da lucchetti di sicurezza per la protezione di carichi pregiati.

Caratteristiche	H21	H22

Tank car

A tank car (International Union of Railways (UIC): tank wagon) is a type of railroad car (UIC: railway car) or rolling stock designed to transport **liquid and gaseous commodities**.

Carro cisterna. Adatto al trasporto di merci liquide, il cui esempio più classico è quello relativo ai derivati del petrolio, è fornito di appositi bocchettoni per il carico nella parte superiore e di uno o più scomparti divisori interni. La maggior parte dei vagoni di questo tipo è di proprietà privata essendo progettati per il trasporto di uno specifico tipo di materiale difficilmente compatibile con altri.

Refrigerator car

A refrigerator car (or "reefer") is a refrigerated boxcar (U.S.), a piece of railroad rolling stock designed to carry **perishable freight at specific temperatures**. Refrigerator cars differ from simple insulated boxcars and ventilated boxcars (commonly used for transporting fruit), neither of which are fitted with cooling apparatus.

Carro a temperatura controllata tipo "INTERFRIGO". Fornito di appositi compressori e grazie alle pareti coibentate consente di controllare la temperatura interna durante il trasporto, evitando di interrompere la catena del freddo nel caso di trasporti alimentari, oppure di evitare il gelo ai materiali ad esso sensibili durante i mesi più freddi dell'anno.

Autorack

An **autorack**, also known as an **auto carrier** (also car transporter outside the US), is a specialized piece of railroad rolling stock used to transport **automobiles and light trucks**. Autoracks are used to transport new vehicles from factories to automotive distributors, and to transport passengers' vehicles in car shuttles and motorail services

Carro bisarca (per trasporto di auto). È in genere a 3 assi e formato da due livelli di carico, accessoriato con rampe alle estremità per consentire un agevole carico e scarico. Anche questo tipo di vagoni è normalmente posseduto da aziende specializzate in questo tipo di trasporto.

Rail cars for pallets

Flatcar

A Florida East Coast Railway flatcar carries two shipping containers

Flatcars are used for loads that are too large or cumbersome to load in enclosed cars such as boxcars. They are also often used to transport intermodal containers (shipping containers) or trailers as part of intermodal freight transport shipping.

Carro porta-container. È un vagone fornito di semplice piano di appoggio ma con agganci specifici per i container. Utilizzato per il trasporto intermodale.

Flatcar

A **well car**, also known as a **double-stack car or stack car**

the usage of **double-stack cars** has revolutionized rail transportation with additional fuel efficiency and cost reductions of about 40%.

Train in Arizona, with 20-, 40- and-53 foot containers double stacked in well cars

A car to carry special weapons (DB Krupp)

Rolling highway

In rail transportation, a rolling highway, or rolling road is a form of combined transport involving the conveying of road trucks by rail, referred to as Ro-La trains. The concept is a form of piggyback transportation.

Carro ultrabasso. Utilizzato per il trasporto di autosnodati, o autotreni con rimorchio, le cosiddette autostrade viaggianti, ha carrelli di 4 assi ciascuno ed è equipaggiato con ruote di diametro ridotto onde ottenere un piano di carico molto più basso rispetto agli altri tipi di vagoni il che permette di trasportare gli autocarri rientrando nei limiti di sagoma prescritti.

RoadRailer

In railroad terminology a Roadrailer or RoadRailer is a highway trailer, or semi-trailer, that is specially equipped for use in railroad intermodal service.

Side view of a Roadrailer's regular truck showing the connection between two trailer bodies. This image shows only *one* fifth wheel.

Block train

A block train is a freight train that runs as a unit from the loading point to the unloading point without intermediate stops. This is referred to as a point-to-point traction service.

Un treno blocco è un treno merci che viaggia dal punto di carico a quello di scarico come unità senza fermate intermedie, in questo caso si parla di servizio di trazione da punto a punto.

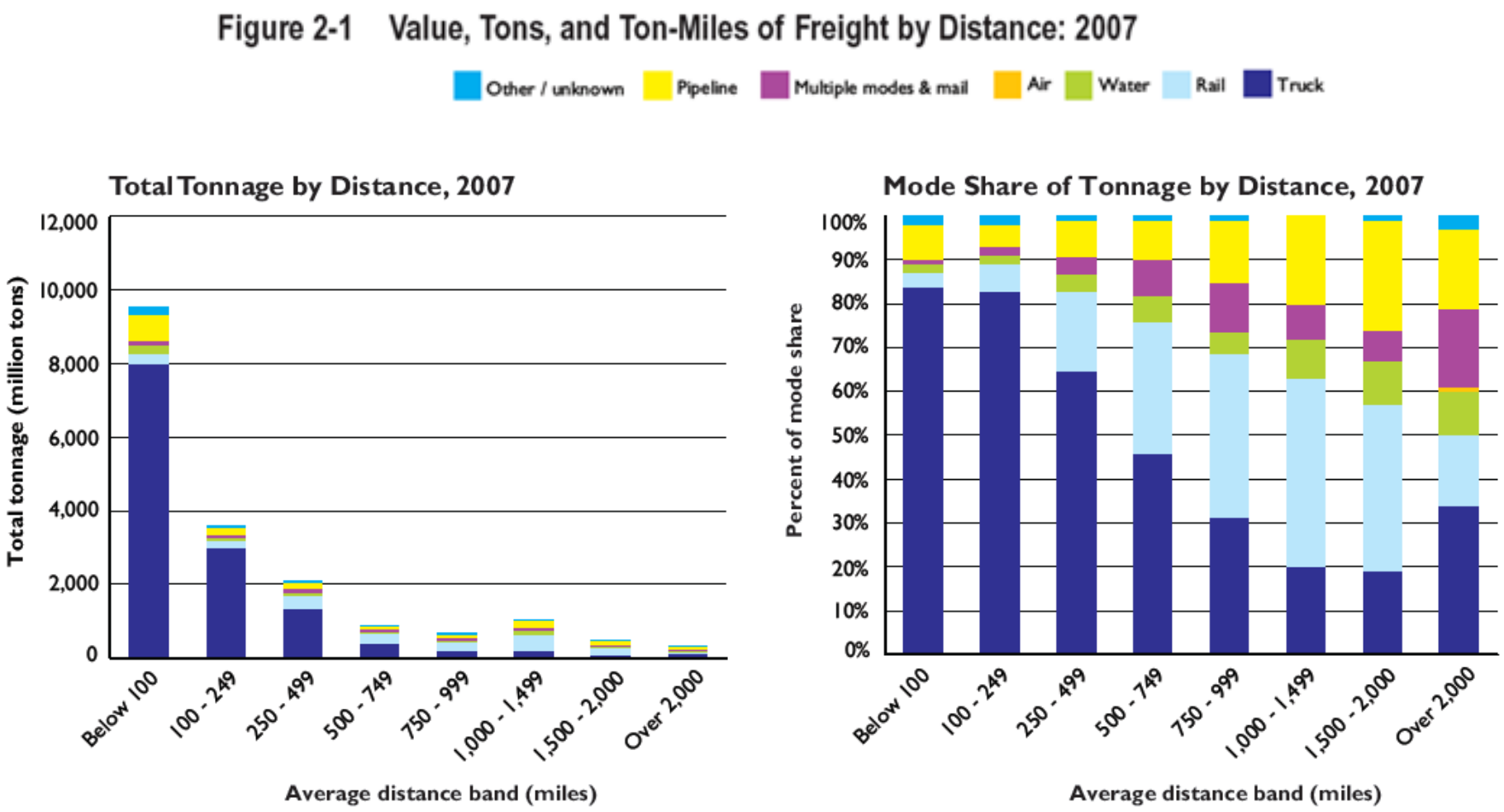
Statistical evidence of freight rail transport use and competiveness

Evidence from Italian data: rail transportation is mostly used to transport heavy, bulky, low value goods

Tabella 1 – Beni trasportati via ferrovia in Italia (in milioni di tonnellate-km)

		2003		2004		2005	
1	Cereali	297	1%	353	2%	361	2%
2	Patate, frutta e verdura fresca o congelata	52	0%	36	0%	23	0%
3	Animali vivi, barbabietole da zucchero	26	0%	20	0%	0	0%
4	Legno e sughero	1423	7%	1349	6%	1226	6%
5	Tessili, articoli tessili e fibre artificiali, altre materie prime di origine animale o vegetale	6	0%	6	0%	3	0%
6	Derrate alimentari e foraggere	1076	5%	1210	6%	1134	6%
7	Oleaginosi	2	0%	1	0%	9	0%
8	Combustibili minerali solidi	115	1%	105	0%	103	1%
9	Petrolio greggio	2	0%	0	0%	0	0%
10	Prodotti petroliferi	647	3%	565	3%	483	2%
11	Minerali di ferro, rottami e polveri d'alto forno	798	4%	903	4%	921	5%
12	Minerali e cascami non ferrosi	15	0%	13	0%	13	0%
13	Prodotti metallurgici	2984	15%	2986	14%	2840	14%
14	Cementi, calci, materiali da costruzione manifatturati	183	1%	335	2%	316	2%
15	Minerali grezzi e manufatti	1077	5%	1464	7%	1168	6%
16	Concimi naturali e manufatti	109	1%	123	1%	88	0%
17	Prodotti carbochimici, catrami	40	0%	38	0%	42	0%
18	Prodotti chimici, esclusi i prodotti carbochimici e i catrami	524	3%	450	2%	478	2%
19	Cellulosa e cascami	141	1%	119	1%	118	1%
20	Veicoli e materiali da trasporto, macchine, motori, anche smontati, e parti staccate	941	5%	984	5%	920	5%
21	Articoli metallici	80	0%	58	0%	63	0%
22	Vetro, vetreria, prodotti della ceramica	176	1%	53	0%	44	0%
23	Cuoio, tessili, abbigliamento, articoli manufatti diversi	456	2%	432	2%	386	2%
24	Articoli diversi	9126	45%	9446	45%	9391	47%
	Totale	20299	100%	21047	100%	20130	100%

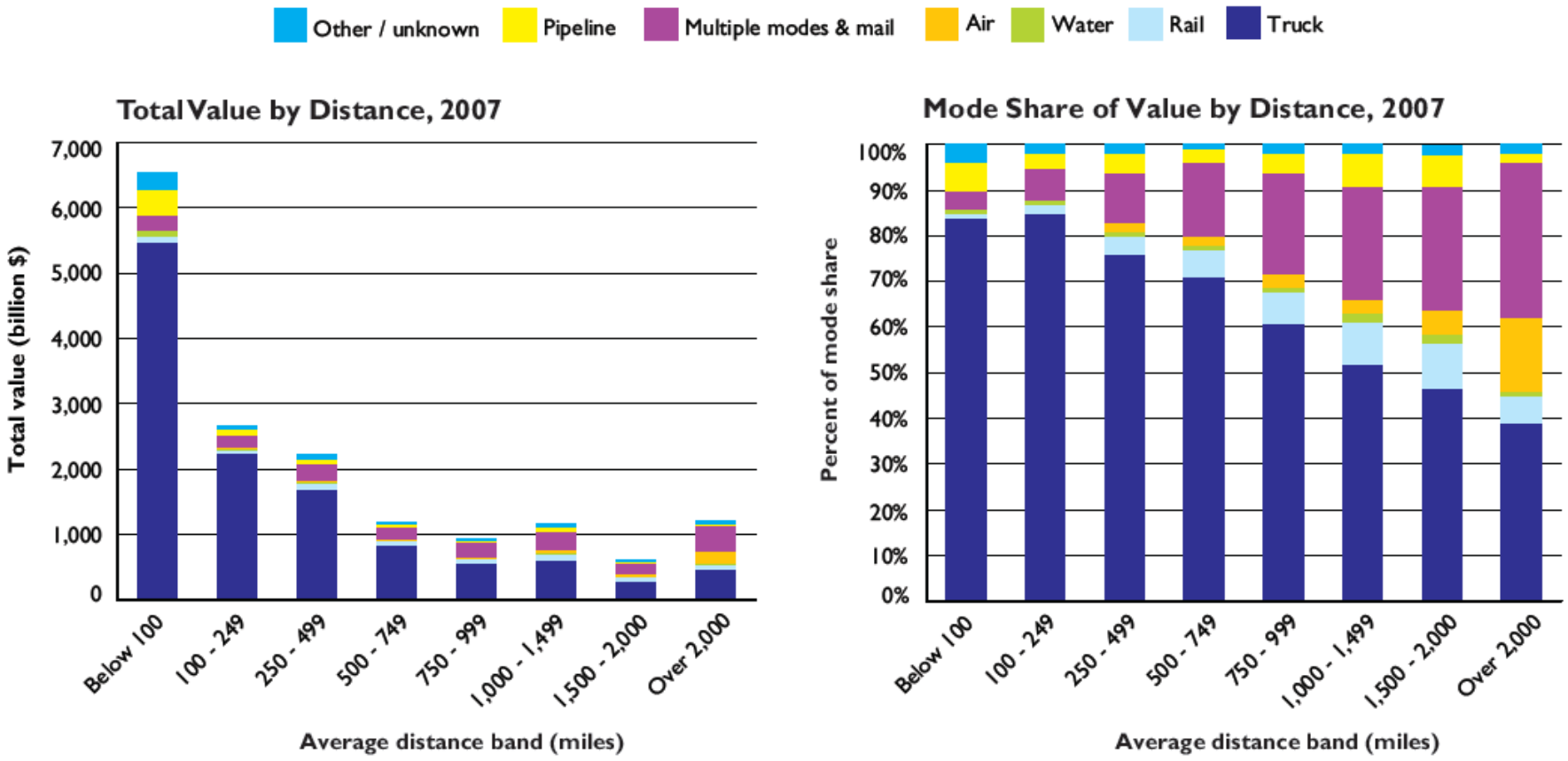
US statistics: Rail's share increases with distance



Freight railway transport in the USA

US statistics: Rail's share increases with distance, but it carries lower value goods

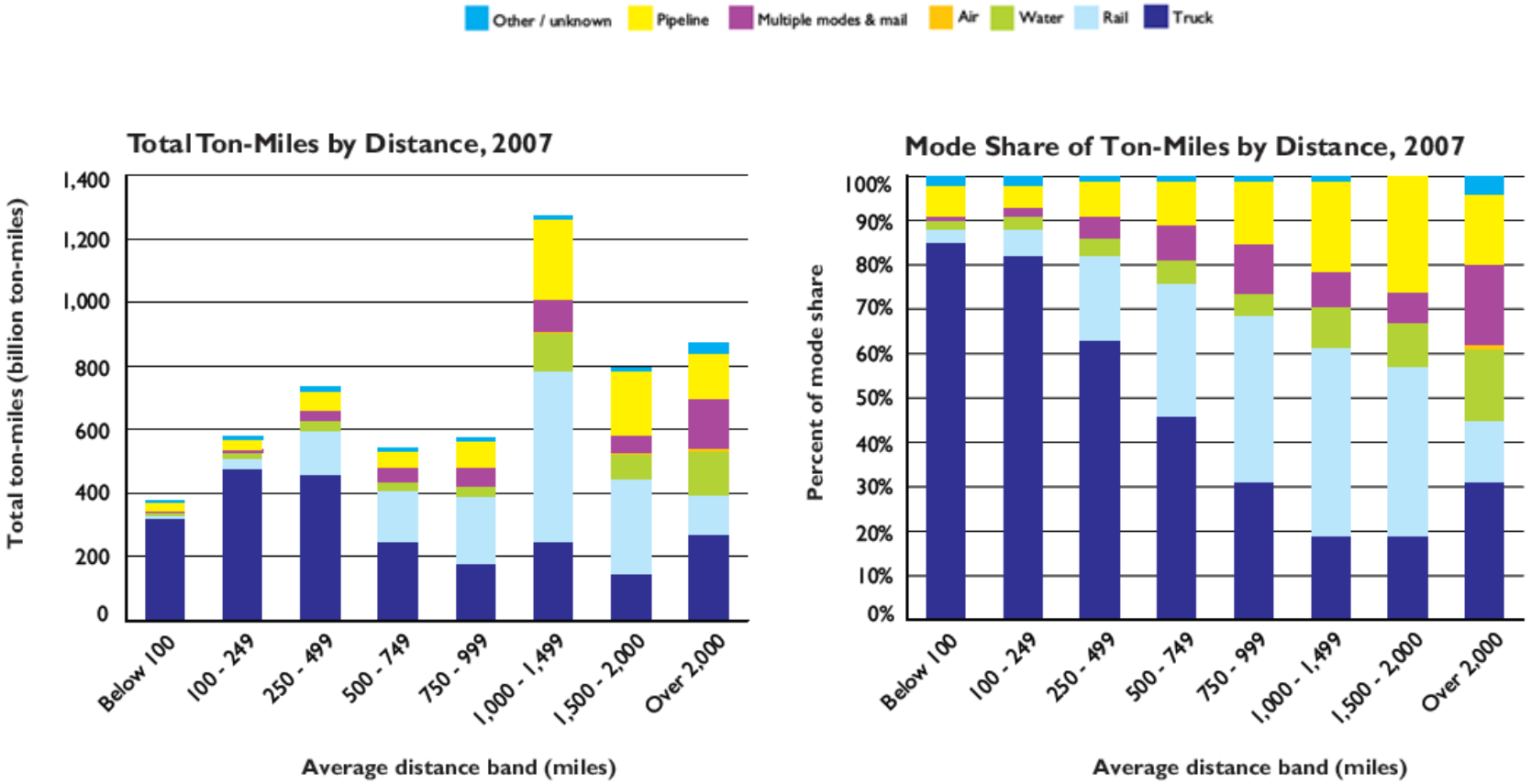
Figure 2-1 Value, Tons, and Ton-Miles of Freight by Distance: 2007



Freight railway transport in the USA

US statistics: Rail's share increases with distance and it carries heavier goods

Figure 2-1 Value, Tons, and Ton-Miles of Freight by Distance: 2007



SOURCE: U.S. Department of Transportation (USDOT), Bureau of Transportation Statistics, and USDOT, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.5, 2015.

Freight railway transport in the USA

Advantages and disadvantages of rail transport relative to road transport for inland shipments: a discussion

Rail's technical advantages: energy efficiency, loading capacity, safety

Rail transport is capital-intensive but **very energy-efficient**. The tracks provide smooth and hard surfaces on which the wheels of the train can roll with **a minimum of friction**.

Metal wheels on metal rails have a significant advantage of overcoming resistance (in pounds or Newtons) compared to rubber-tired wheels on any road surface: railway - 0.001g at 10 mph and 0.024g at 60 mph; truck - 0.009g at 10 mph and 0.090 at 60 mph.

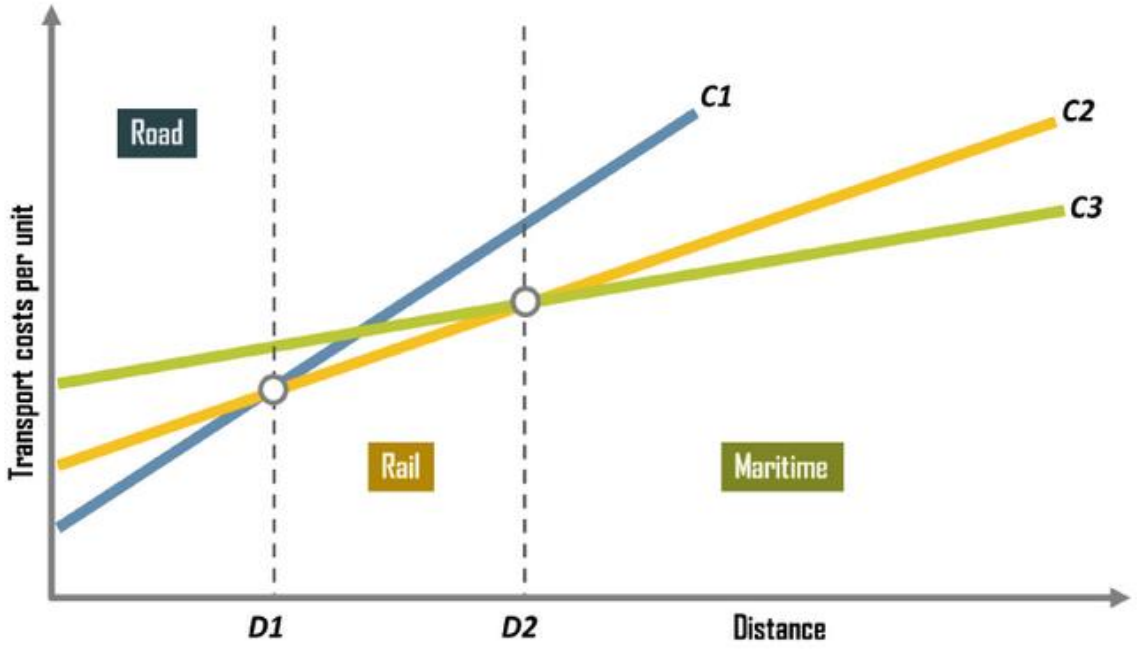
In terms of **motion power** (horsepower/weight ratio), **a slow-moving barge requires 0.2 hp/net ton,a railway and pipeline require 2.5 hp/net ton, while a truck requires 10 hp/net ton**. However, at higher speeds, a railway overcomes the barge and proves most economical.

Trains have a small frontal area in relation to the load they are carrying, which reduces air resistance and thus energy usage.

Other technical advantages:

- The track **distributes the weight of the train evenly**, allowing significantly greater loads per axle and wheel than in road transport, leading to less wear and tear on the permanent way.
- In addition, **the presence of track guiding the wheels allows for very long trains** to be pulled by one or a few engines and driven by a single operator, even around curves, which allows for economies of scale in both manpower and energy use; **by contrast, in road transport**, more than two articulations causes **fishtailing** and makes the vehicle unsafe.

The traditional Hoover diagram: fixed and variable cost difference among modes



Rail is supposed to have higher fixed costs than road but lower than maritime transport.
Rail is supposed to have lower variable costs with distance than road but higher than maritime transport.
As a results, rail is competitive for shipments longer than D1 and shorter than D2.
Note that costs are assumed to vary with distance only, disregarding the type of good transported, potential transshipment costs, the time and punctuality dimension, flexibility, social costs and so on.

Rail freight vs road freight transport: pros, cons and undecided aspects

Rail Freigt Transport: Pros

- Historical role. Rail transportation accelerated the **industrialization process**. The construction of the rail infrastructure and the rolling stock spur industrial activities. Rail transportation had also multiplier effects on industrial activities. It spurred **economic development** and the diffusion of human settlements in inland locations.
- Long distance shipments. Rail transportation is particularly competitive for long distance inland shipments. The average length of a domestic rail freight haul was 1,300 km in the United States, compared with 700 km for trucks.
- Heavy, bulky and low value commodities. Due to its technical characteristics (energy efficiency, large number of railroad cars in a train, reasonable speed), Rail transportation enables the transport of raw materials (paper, wood, grain, chemicals, metallic products, cars, agricultural equipment, etc.). No other land transportation mode has the **capacity** of rail as a wagon can carry up to 100 tons of freight, more than three times that of a truck. Intermodal integration. Rail transportation loads\unload the large numbers of containers arriving at a port via container ships using services such as RO-LA\piggy back trains, container trains, block trains, double-stack trains.
- Ports' connection. Rail transportation provides an important link between ports and the hinterland (inland ports, logistic centers, intermodal centers).
- Safety. Rail transportation is one of the more safest modes of transport, both for freight and passengers

Rail Freight Transporta: Cons

- Construction and maintenance costs. Rail transport has high construction and maintenance costs.
- Fixed and limited origin-destination point, instead of door-to-door service. The rail network is fixed and connects a limited number of points (stations). A road leg by truck might be needed from the location of the manufacturing firm to the departing station and from the arriving train station to the final destination. That adds cost and transport time.
- Transshipments costs and time. Often goods need to be loaded and unloaded onto the train from\to another mode of transport (ship or truck). This not only increase costs and time, but also increases the risk of damage during the transshipment.
- Flexibility (time to organize a shipment). Firms might require last minute, unplanned transport services. Road transport is believe to be easier and faster to organize than road transport.

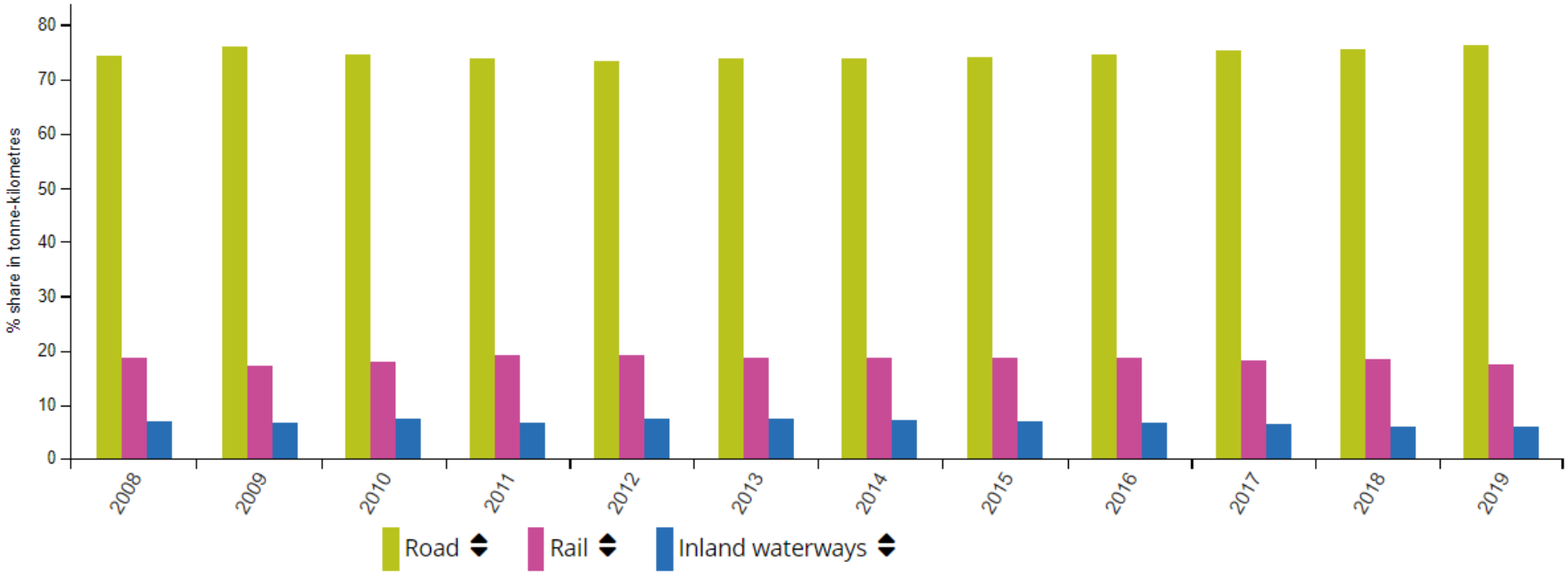
Rail Freight Transportation: undecided, but crucial aspects for mode competition

- Overall travel time of a shipment. Relative to road freight transport, the overall travel time of freight rail transport is usually higher on short to median distances, but it might be lower for long distance shipments (the truck driver is allowed to drive only a given number of hours than take a rest; he must sleep; the trucks are not allowed on week-ends). The road transport regulation impact the overall travel time for long distance trips.
- Empty returns. It is generally be more difficult to avoid "empty returns" for road freight transport than for rail freight transport. It depends on the markets, type of goods and origin-destination pairs. Empty returns add to the overall transport costs.
- Overall transport costs of a shipment:
  - a train need one (max two) train operator for a large number of train wagons; a truck carries a more limited load. Labor cost are an important cost component. Freight rail transport enjoys economies of scale, while road transport does not. As a result, for some goods and over longer distances, the cost of a freight rail transport service might be lower than that of a truck service.
  - over short to medium distance trips and for small-size shipments, the cost of using the service of a truck is usually lower.
  - The strong competition among road transport providers drives the price down. Freight transport operates in much less competitive environment (monopoly, oligopoly)

Statistics on rail freight modal share

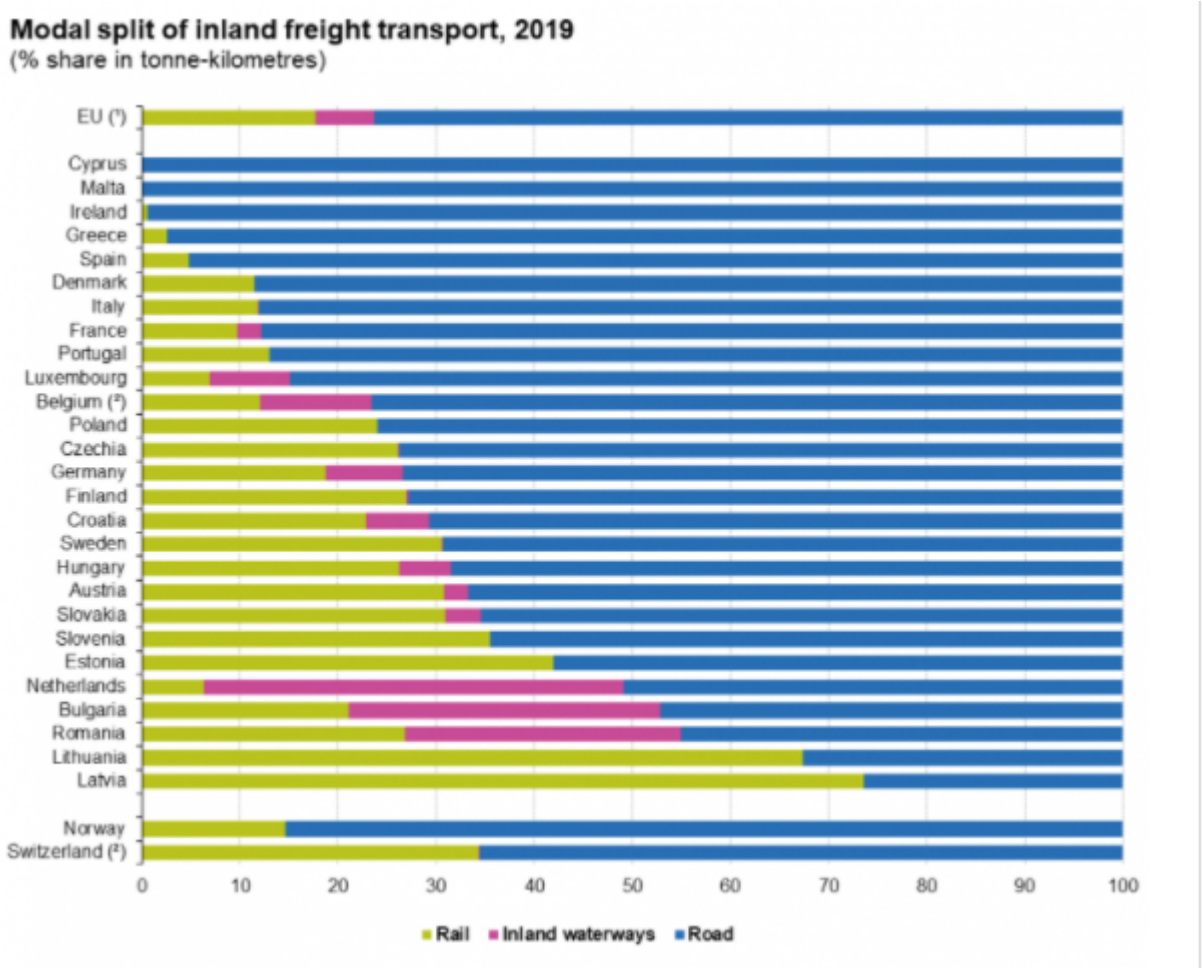
Rail's modal share in Europe: less than 20 percent

Modal split of inland freight transport, EU, 2008-2019



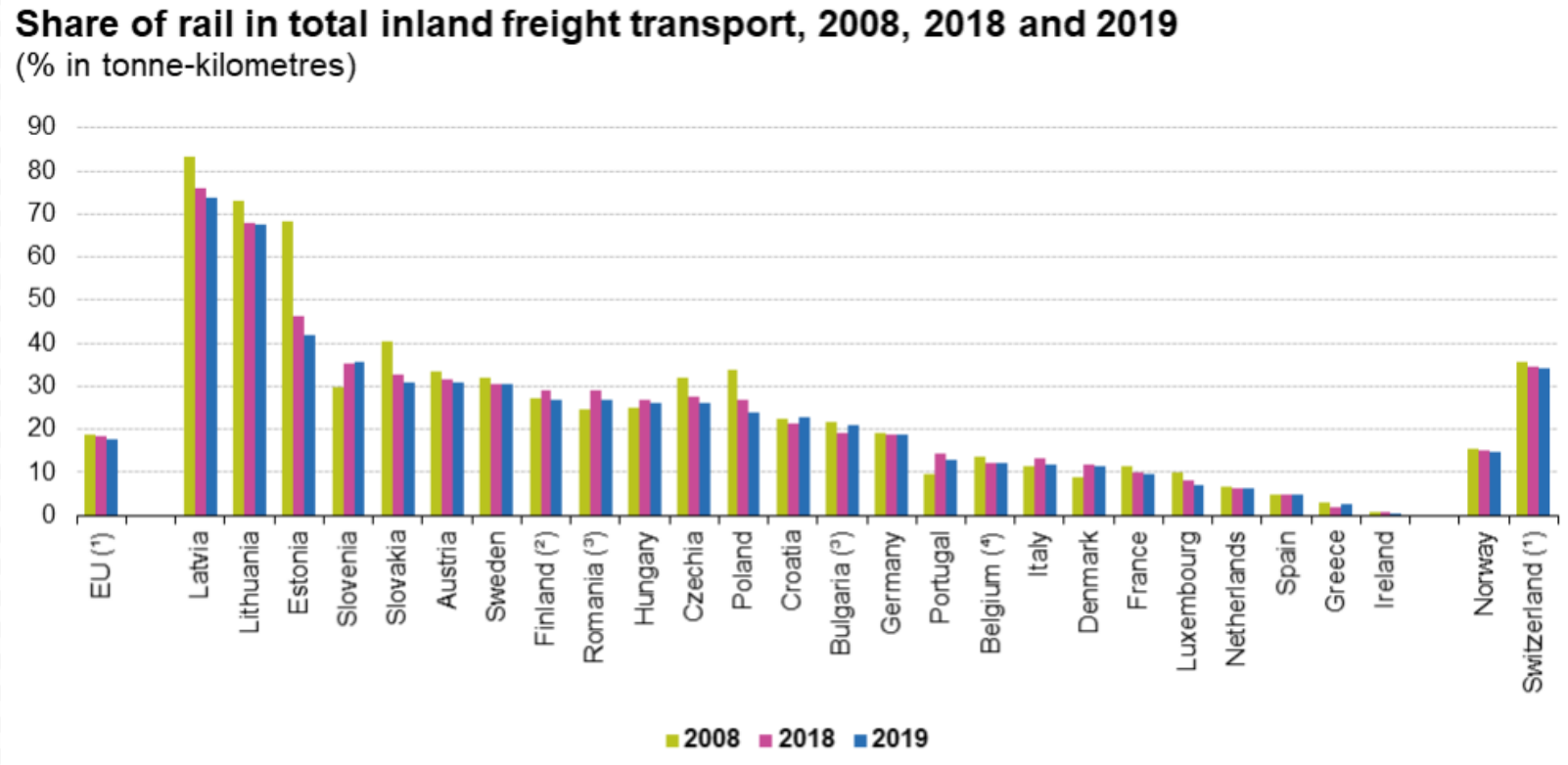
- In 2019, road freight transport accounted for 76.3 % of the total inland freight transport, followed by rail and inland waterways transport (17.6 % and 6.1 % respectively).
- In 2019, Lithuania had the highest share of rail freight transport in total inland freight transport, with 74 %.
- In 2019, the Netherlands had the highest share of inland waterways freight transport in total inland freight transport, with 43 %.
- Road is the leading mode of freight transport at intra-EU level (53 %) followed by maritime transport (30 %) and rail transport (12 %).

Rail's modal share in European countries



Rail's modal share varies by country: it is higher in Eastern European countries for historical reasons and depending on truck availability…

….but loosing market share also and especially in Eastern European countries



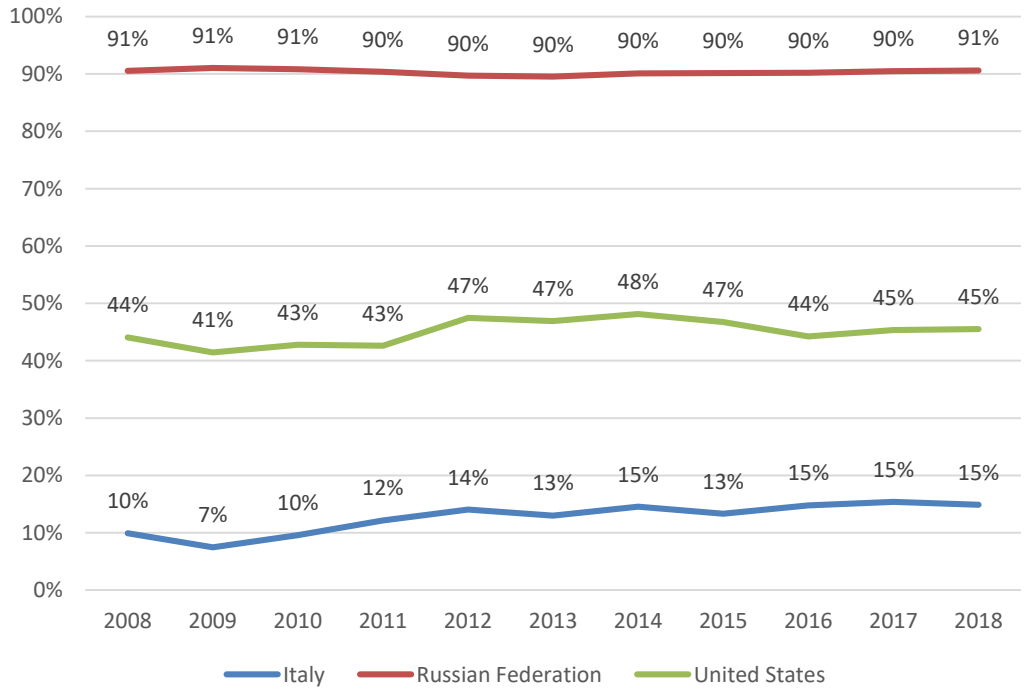
International statistics

Freight Modal share (in all kinds of transport)

Country	modal share [%]	*year*
Russia	65	2006[4]
Latvia	61	2008[8]
People's Republic of China	58	2006[4]
Switzerland	54	2008[8]
Estonia	45	2008[8]
US	42	2006[4]
Lithuania	42	2008[8]
Austria	37	2008[8]
Sweden	35	2008[8]
Finland	27	2008[8]
Poland	24	2008[8]
Czech Republic	23	2008[8]
Slovakia	23	2008[8]
Germany	22	2008[8]
Bulgaria	21	2008[8]
Hungary	21	2008[8]
Japan	20	2000[5]
Romania	19	2008[8]
EU	18	2008[8]

Rank	Country	Modal share (%)	Data year
1	Canada	68[46]	2009
2	Latvia	61[47]	2012
3	Russia	59[46]	2010
4	Estonia	47[47]	2012
5	Switzerland	46[24]	2012
6	United States	44[46]	2008
7	Austria	41[47]	2012
8	Sweden	40[47]	2012
9	Australia	40[48]	2009
10	Lithuania	38[47]	2012
11	China	31[46]	2009
12	India	31[49]	2016
13	Finland	27[47]	2012
14	Brazil	25[50]	2005
15	Romania	24[47]	2012
16	Germany	23[47]	2012
17	Czech Republic	22[47]	2012
18	Hungary	21[47]	2012
19	Slovakia	20[47]	2012
20	Poland	18[47]	2012
21	Belgium	18[47]	2012
22	France	15[47]	2012
23	Italy	14[47]	2012

Rail freight transport modal split in selected countries based on OECD statistics (my estimates based on the indicator tonnes-kilometres)



The size of the country matters!

The larger the country, the longer the shipment distances, the more convenient rail transport becomes, especially for heavy goods!

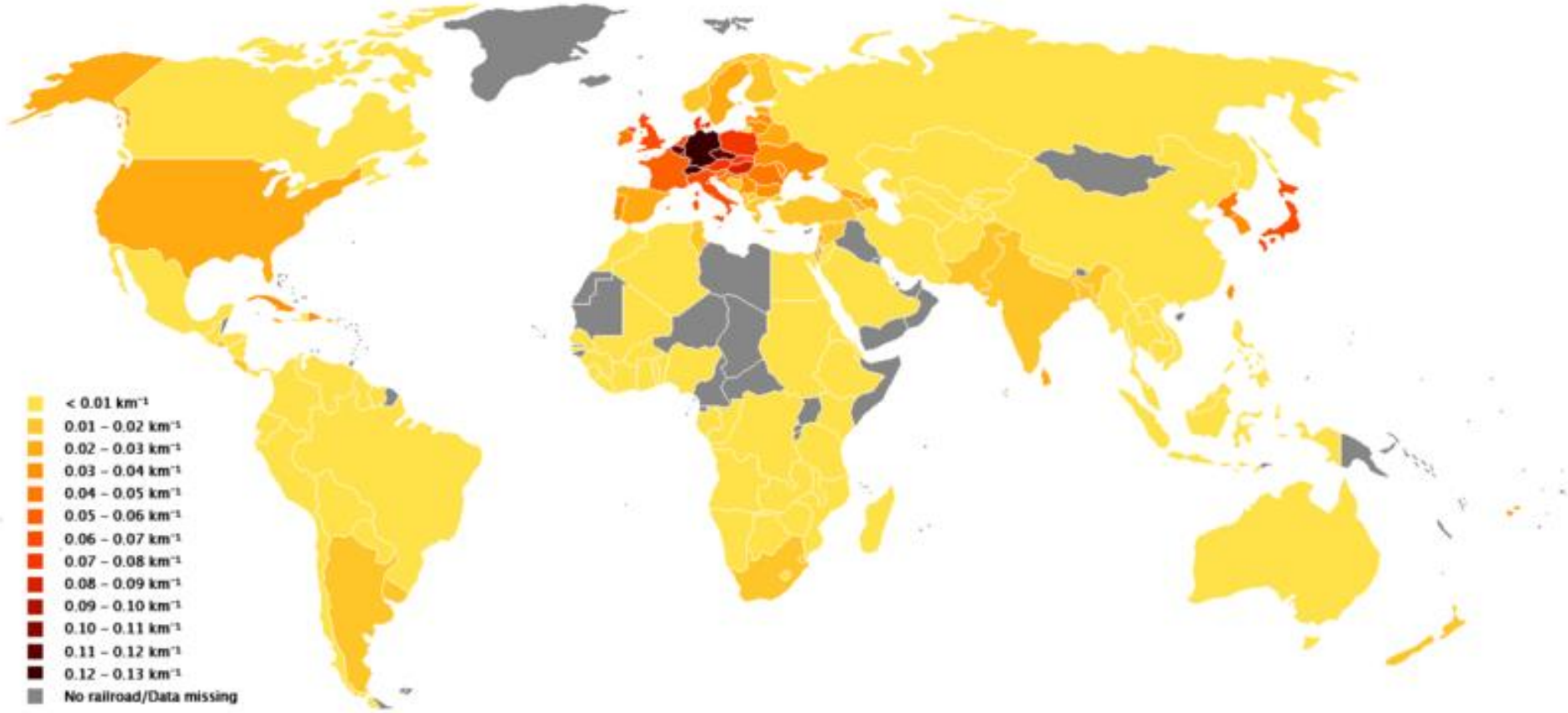
Tonnes-kilometres, Millions

PS. The estimates for Italy and the US coincide with other statistical sources. The estimate for the Russian Federation might be overestimated

Impact of road competition on the economics of rail

- Since the end of the 1950s, railway systems in advanced economies have faced an **increasing competition from road transport**, with varying results.
- In most instances, the **breakeven distance** (that is a threshold above which rail becomes competitive with respect to road), **changed to the advantage of road transport**.
- Currently, the breakeven distance between intermodal rail and truck is estimated **between 600 and 800 miles** (950 and 1,300 km). Under 500 miles (800 km), drayage costs from the terminal usually account for 70% of total costs.
- The rail's loss of market share lead many rail freight operators to **financial distress**. Governments had to step in to save the rail freight operators from bankruptcy.

Rail network divided by area of country: not all countries have a dense rail network!



Freight railways structure

Factors that influence the capacity of the freight rail system:

- ownership of tracks and rolling stock (private vs. public)
- maximum train length
- signaling equipment (level of automatization)
- maintenance schedule
- traffic mix (freight vs passenger)

The institutional arrangement of the rail sector varies by country: comparison between European, North American and Pacific Asian Railways

Issue	Europe	North America	Pacific Asia
Organization	Separation of infrastructure from operations (for accountancy purposes)	Separation by region (markets) (private companies and concessions of vertically integrated companies)	Infrastructure and operations publicly owned
Market Focus	Passenger oriented	Freight oriented	Passenger oriented
Ownership	Infrastructure mainly publicly owned with a few exceptions (e.g. UK). Freight equipment and terminals increasingly privately owned and operated.	Private	Public
Distance	Short to medium	Medium to long	Short to long

Source: adapted from: C. Nash and C. Rivera-Trujillo (2004) "Rail regulatory reform in Europe - principles and practice", STELLA Focus Group 5 synthesis meeting, Athens.

State subsidies

Rail transportation **used to be highly dependent from government subsidies in several countries**. Governments funded most rail projects, mainly for the sake of national economic imperatives. This has created several ***rail monopolies with an integrated management of infrastructure***, but with several imposed routes. However, many rail systems underwent deregulation with private operators since it became harder and harder to sustain the subsidies weight in the public budgets.

For subsidies in Europe, see European rail subsidies

Country	Subsidy in billions of Euros	Year
Germany	17.0	2014[81]
France	13.2	2013[82]
Italy	8.1	2009[83]
Switzerland	5.8	2012[84]
Spain	5.1	2015[85]
United Kingdom	4.5	2015[86]
Belgium	3.4	2008[80]
Netherlands	2.5	2014[87]
Austria	2.3	2009[80]
Denmark	1.7	2008[80]
Sweden	1.6	2009[88]
Poland	1.4	2008[89]
Ireland	0.91	2008[89]

Passenger rail transport: an international comparison

Video on China' high speed trains

https://www.youtube.com/watch?v=0JDoll8OEFE

Passenger-kilometres of rail transport per year

Rank	Country/Region	Billion passenger-kilometres	Data year
1	China	1,346[2]	2017
2	India	1,147	2015
3	Japan	427[3]	2015
4	Russia	120.4	2014
5	France	83.2	2015
6	Germany	79.3	2015
7	United Kingdom	66.0[4]	2016
8	Italy	40.4	2015
9	Ukraine	37.1	2015
10	Spain	25.9	2015
11	South Korea	23.1	2015
12	Pakistan	20.3	2015
13	Taiwan	19.8	2015
14	Switzerland	18.8	2015
21	Belgium	10.3	2015
22	United States	10.3[note 1]	2010
23	Belarus	7.2	2015

Passenger modal share for rail

Rank	Country	Modal share (%)	*year*
1	Japan	37.2	2016[4][49]
2	Russia	24.4	2018[50]
3	Switzerland	20.9	2017[51]
4	Austria	12.1	2016[52]
5	Netherlands	11.0	2016[52]
6	India	10.0	2018[53]
7	France	9.7	2016[52]
8	Slovakia	9.4	2016[52]
9	Hungary	9.3	2016[52]
-	Sweden	9.3	2016[52]
10	Czech Republic	8.9	2016[52]
11	United Kingdom	8.8	2016[52]
12	Denmark	8.6	2016[52]
-	Germany	8.6	2016[52]
14	Belgium	7.7	2016[52]
15	Poland	7.3	2016[52]
16	Spain	6.6	2016[52]
17	Indonesia	6.3	2005[54]
18	Italy	6.1	2012[55]

https://en.wikipedia.org/wiki/List_of_countries_by_rail_usage

Passenger km per head of population

Only countries with five billion or more passenger km ar

Country	Kilometers/year
Switzerland	2,422
Japan	1,995
France	1,370
Denmark	1,329
Austria	1,245
Russia	1,220
Ukraine	1,150
Belarus	1,030
Belgium	1,009
Netherlands	940
Germany	910
Kazakhstan	880
Italy	780
India	777
United Kingdom	770
Hungary	690
Czech Republic	660
People's Republic of China	653
South Korea	650
Sweden	620
Egypt	550
Spain	460
Poland	450
Republic of China	410
Romania	380
Iran	180
Argentina	170
Pakistan	160
Thailand	150
Indonesia	110
Turkey	80
United States	80

Modal split of rail passenger transport in Europe in 2019

Country	%
Switzerland	20
Austria	12.9
Netherlands	11.3
Sweden	10.5
France	10.4
Slovakia	10.2
Czechia	9.9
Germany	9.4
United Kingdom	8.5
Belgium	8.4
Hungary	8.3
Denmark	8.2
European Union - 28 countries (2013-2020)	8.1
European Union - 27 countries (from 2020)	8
Poland	7.3
Spain	7.1
Italy	6.3
Finland	6.2
Norway	4.9
Luxembourg	4.8
Portugal	4.6
Romania	4.2
Latvia	3.4
Ireland	3.3
Turkey	3.3
Croatia	2.4
Bulgaria	2.2
Estonia	2.2
Slovenia	1.8
Montenegro	1.2
Greece	1
Lithuania	1
Serbia	0.7
North Macedonia	0.6
Cyprus	na
Malta	na
Iceland	na

Switzerland stands out with 20%. Austria follows at a distance

Rail transport in Italy

- The rail network
- Passengers
- Freight

The rail network in Italy: stable

Tab. IV.1.2 - Estensione della rete ferroviaria - Anni 2001, 2005, 2010 e 2015-2018

		2001	2005	2010	2015	2016	2017	2018	2019
Rete elettrificata	km	10.864	11.364	11.906	11.941	12.023	12.022	12.018	12.016
%		*67,8*	*70*	*71,3*	*71,4*	*71,6*	*71,6*	*71,6*	*71,6*
Rete non elettrificata	km	5.171	4.862	4.798	4.783	4.765	4.765	4.763	4.763
%		*32,2*	*30*	*28,7*	*28,6*	*28,4*	*28,4*	*28,4*	*28,4*
Totale Rete:	**km**	**16.035**	**16.225**	**16.704**	**16.724**	**16.788**	**16.787**	**16.781**	**16.779**
Rete a semplice binario	km	9.805	9.451	9.191	9.161	9.141	9.091	9.060	9.057
%		*61,1*	*58,3*	*55,0*	*54,8*	*54,4*	*54,2*	*54,0*	*54,0*
Rete a doppio binario	km	6.230	6.774	7.513	7.563	7.647	7.696	7.721	7.721
%		*38,9*	*41,7*	*45,0*	*45,2*	*45,6*	*45,8*	*46,0*	*46,0*
Rete con blocco automatico	km	5.434	5.829	6.473	6.409	6.473	6.572	6.590	6.630
%		*33,9*	*35,9*	*39,0*	*38,3*	*38,6*	*39,1*	*39,3*	*39,5*

Fonte: Gruppo Ferrovie dello Stato Italiane.

nodi (cfr. Fig. IV.1.4A nella cartella "Gruppo FS Italiane" allegata al CNIT). La rete gestita da RFI è quasi integralmente attrezzata con i più moderni sistemi tecnologici per la gestione della circolazione. Il 70% circa delle linee è infatti attrezzato con sistemi di telecomando della circolazione (SCC, Sistema Comando e Controllo e CTC+DPC, sistema di Controllo del Traffico Centralizzato con Dirigenza Posto Comando). Per quanto riguarda regimi di circolazione in sicurezza, la rete è inoltre dotata del Sistema di Controllo della Marcia del Treno (SCMT) su circa il 70% della sua lunghezza, di sistemi di supporto alla guida (SSC) su circa il 25% della sua lunghezza, ed ancora del sistema ERTMS sulle linee *AV/AC*, circa il 6% dell'estensione totale della rete. Il sistema ERTMS (European Rail Traffic Management System), messo a punto proprio dal Gruppo FS Italiane, costituisce l'attuale standard europeo interoperabile di gestione del traffico ferroviario.

Rail's traffic: declining

Tab. IV.1.3 - Traffico ferroviario viaggiatori e merci sul territorio nazionale - Anni 2001, 2005, 2010, 2015-2019

		2001	2005	2010	2015	2016	2017	2018	2019
Viaggiatori-km	Mln	46.752	46.527	43.349	39.290	38.416	39.010	39.450	39.308
- di cui M/L percorrenza	*Mln*	*27.280*	*25.485*	*20.637*	*20.388*	*19.855*	*20.306*	*20.596*	*20.118*
- di cui Regionale	*Mln*	*19.472*	*21.042*	*22.712*	*18.902*	*18.561*	*18.704*	*18.854*	*19.190*
Tonnellate-km	Mln	24.352	22.199	13.405	11.957	11.904	11.597	11.020	10.671
Ricavi traffico viaggiatori	Mln €	2.111	2.231	2.754	2.820	2.769	2.963	2.966	3.115
- di cui M/L percorrenza	*Mln €*	*1.494*	*1.510*	*1.912*	*1.990*	*1.903*	*2.022*	*1.987*	*2.080*
- di cui Regionale	*Mln €*	*617*	*721*	*842*	*830*	*866*	*941*	*979*	*1035*
Ricavi da CdS e da Stato	Mln €	1.214	1.258	1.947	1.892	1.923	2.009	2.040	2.037
Ricavi traffico merci	Mln €	731	724	498	477	470	463	445	444
Ricavo traffico medio a viagg-km	Cent/€	4,5	4,8	6,4	7,2	7,2	7,6	7,5	7,9
- di cui M/L percorrenza	*Cent/€*	*5,5*	*5,9*	*9,3*	*9,8*	*9,6*	*10,0*	*9,6*	*10,3*
- di cui Regionale	*Cent/€*	*3,2*	*3,4*	*3,7*	*4,4*	*4,7*	*5,0*	*5,2*	*5,4*
Ricavo medio da CdS Regionale a viagg-km	Cent/€	6,2	6	8,6	10,0	10,4	10,7	10,8	10,6
Ricavo medio a tonn-km	Cent/€	3	3,3	3,7	3,1	3,9	4,0	5,0	4,2

Nota: dal 2005 al 2009 i viaggiatori-km comprendono anche i volumi realizzati dalla società Cisalpino AG sul territorio nazionale. A partire dal 2011, i dati di produzione del trasporto regionale non comprendono i servizi relativi alla Regione Lombardia, da quell'anno eserciti dalla nuova società Trenord, non consolidata nel Gruppo Ferrovie dello Stato Italiane. La serie storica del ricavo medio a tonn-km è stata rivista a seguito della cessione del ramo di azienda, Divisione Cargo di Trenitalia, nel Polo Mercitalia.

Fonte: Gruppo Ferrovie dello Stato Italiane.

Do people use more the bus or the train for the intercity travel? Bus

Tab. 7.4 - Traffico totale interno[1] di passeggeri - Anni 2005, 2010, 2015-2020

Milioni di passeggeri-km

Modalità di trasporto	2005	2010	2015	2016	2017	2018	2019	2020
Impianti fissi	**50.463**	**47.574**	**52.695**	**53.003**	**54.039**	**56.303**	**57.341**	***21.592***
Trasporti ferroviari[2]	50.088	47.172	52.207	52.178	53.231	55.493	56.586	*21.206*
-di cui grandi Imprese	46.144	43.349	51.121	51.716	52.778	55.037	56.160	*21.046*
- di cui piccole e medie Imprese	3.944	3.823	1.086	462	453	456	426	*160*
Altri (tramvie extraurbane e funivie)	375	401	489	825	808	810	755	*385*
- di cui tranvie extraurbane	50	72	78	78	79	80	82	*45*
- di cui funivie	*325*	*329*	*411*	747	729	730	673	*340*
Trasporti collettivi extraurbani	**89.329**	**90.134**	**91.558**	**91.293**	**91.085**	**91.002**	**92.183**	**51.069**
Autolinee e filovie	17.865	16.825	17.783	17.452	17.174	17.036	18.159	*10.060*
Autolinee comp. statale, noleggio e privati	*71.464*	*73.309*	*73.776*	*73.841*	*73.910*	*73.966*	*74.024*	*41.009*
Trasporti collettivi urbani	**17.678**	**19.188**	**17.798**	**17.785**	**18.563**	**18.897**	**19.745**	***10.893***
Filovie e autobus	11.625	12.085	10.950	11.020	11.594	11.598	12.110	*6.709*
Altri modi	6.053	7.103	6.848	6.766	6.969	7.299	7.634	*4.184*
- di cui tranvie urbane	1.053	1.135	1.301	1.357	1.387	1.426	1.562	*866*
- di cui metropolitane	4.982	5.948	5.527	5.388	5.562	5.853	6.052	*3.307*
- di cui funicolari	19	20	20	20	20	21	20	11
Navigaz. marittima di cabotaggio	***3.237***	***3.561***	***2.987***	***2.918***	***3.114***	***3.434***	***3.472***	***2.362***
Navigazione interna	**488**	**527**	**603**	**636**	**665**	**664**	**669**	***612***
Navigazione aerea	***12.813***	***15.726***	***17.802***	***18.647***	***19.824***	***20.962***	***21.885***	***6.008***

The large majority of the trains compete in the market

Tab. IV.1.4 - Traffico ferroviario viaggiatori di media e lunga percorrenza - Anni 2001, 2005, 2010, 2015-2019

		2001	2005	2010	2015	2016	2017	2018	2019
Viaggiatori-km	milioni	27.279	25.485	20.637	20.387	19.855	20.306	20.596	20.118
- di cui servizio a mercato	"				*15.869*	*15.649*	*16.303*	*16.828*	*16.313*
- di cui servizio universale contribuito	"				*4.518*	*4.206*	*4.003*	*3.768*	*3.805*
Treni-km	migliaia	82.473	83.975	78.097	79.260	82.914	87.506	90.303	91.784
- di cui servizio a mercato	"				*53.428*	*57.230*	*62.034*	*64.933*	*66.445*
- di cui servizio universale contribuito	"				*25.832*	*25.684*	*25.472*	*25.370*	*25.339*
% treni arrivati fra 0 e 15' di ritardo	%	87	85	91,4	93,0	93,7	94,6	95.7	96,1

Nota: dal 2005 al 2009 i dati relativi a viaggiatori-km, posti-km e treni-km comprendono anche i volumi realizzati dalla società Cisalpino Ag sul territorio nazionale. I dati di puntualità sono espressi in "Standard B", ove sono esclusi i ritardi dovuti a cause esterne al Gruppo Ferrovie dello Stato Italiane (frane, alluvioni, abbattimento barriere e passaggi a livello da parte di terzi, richieste dell'autorità di PS, ecc.) o a scioperi. Nei servizi a mercato sono compresi, oltre alle Frecce, anche tutti gli altri servizi, ad esclusione di quelli universali.

Fonte: Gruppo Ferrovie dello Stato Italiane.

Public investments per mode of transport: mostly to road construction and maintenance

Tab. I.1.4a - Spesa complessiva dello Stato per modo di trasporto - Anni 2005, 2010, 2016-2019

Milioni di euro a prezzi correnti e composizione percentuale

Modi di trasporto	2005	2010	2016	2017	2018	2019
Spesa complessiva	**17.485,8**	**20.621,0**	**21.297,1**	**20.922,9**	**20.797,1**	**21.777,4**
- di cui spese attribuibili	12.669,4	14.603,7	15.698,7	15.802,0	15.810,3	16.301,4
%	*72,5*	*70,8*	*73,7*	*75,5*	*76,0*	*74,9*
- impianti fissi	4.421,0	3.745,2	5.568,5	5.889,2	5.392,4	5.703,1
%	*25,3*	*18,2*	*26,1*	*28,1*	*25,9*	*26,2*
- strada	3.987,0	6.848,3	7.489,3	7.915,7	8.581,3	8.651,1
%	*22,8*	*33,2*	*35,2*	*37,8*	*41,3*	*39,7*
- navigazione interna	55,4	74,2	413,3	217,9	256,0	98,0
%	*0,3*	*0,4*	*1,9*	*1,0*	*1,2*	*0,4*
- navigazione marittima	3.473,7	3.082,6	1.612,7	1.489,9	1.371,9	1.423,5
%	*19,9*	*14,9*	*7,6*	*7,1*	*6,6*	*6,5*
- navigazione aerea	732,2	853,5	614,9	289,2	208,7	425,8
%	*4,2*	*4,1*	*2,9*	*1,4*	*1,0*	*2,0*
- di cui spese non attribuibili	4.816,5	6.017,3	5.598,4	5.121,0	4.986,8	5.476,0
%	*27,5*	*29,2*	*26,3*	*24,5*	*24,0*	*25,1*

Nota: eventuali incongruenze nei totali sono da attribuirsi alla procedura di arrotondamento.

Fonte: elaborazione Ministero delle Infrastrutture e della Mobilità Sostenibili su dati del Ministero dell'Economia e delle Finanze.

The Ferrovie dello Stato Italiane (FSI) group

1905

THE COMPANY IS FOUNDED

On 1 July, the Azienda Unitaria delle Ferrovie dello Stato was founded, supporting the policy of unification: from the station buildings to the style of the carriages, everything was built with a single national criterion.

1927

THE FIRST DIRETTISSIMA

The Rome-Naples "direttissima" (non-stop) service was inaugurated at the same time as the Naples Mergellina station: the first of its kind, designed to allow a high speed service.

1936

THE FIRST ITALIAN ELECTRIC TRAIN

The first 100% Italian electric train, the ETR 200, was built, paving the way to today's High Speed vehicles.

1953

THE LEGENDARY SETTEBELLO

The ETR 300 first appeared on the Rome-Milan line, and was immediately renamed the Settebello for its seven carriages. With its innovative shape, it was the symbol of reconstruction and Italian design.

1976

THE PENDOLINO IS BORN

The first swinging car electric train: the ETR 401, better known as the Pendolino. Designed by Ferrovie dello Stato together with Fiat Ferroviaria to reach 250 km/h, the Pendolino represents a milestone on the way to the Italian High Speed.

1989

THE FIRST RECORD

On the Rome-Florence Direttissima, the ETR 500 X reached 317 km/h, making its first official record recognised by Ferrovie dello Stato and broken shortly after by the ETR 500 Y, reaching 321 km/h.

1992

PROTAGONISTS IN FINANCE

Ferrovie dello Stato became a joint stock company.

1999

THE NEW DIVISIONS

The Company began to be divided into divisions, which by the beginning of the new millennium would lead to the Ferrovie dello Stato Group.

2005

WORLD REFERENCE IN HIGH SPEED

The new Rome-Naples high speed line, the first to adopt the innovative ERTMS/ETCS system, was completed. People came from all over the world, from Japan to America, China and Russia to study the Italian engineering. The new trains travel easily and safety at 300 km/h.

2008

THE BRIDGE OVER THE RIVER PO

The Ferrovie dello Stato Group delivered the High Speed line from Milan to Bologna to the country. The works involved included an extraordinary cable-stayed bridge over the Rover Po. A new Italian speed record is set on the new line: 362 km/h.

2009

THE HIGH SPEED AXIS IS COMPLETED

With the opening of the Bologna-Florence line, which is nearly all in tunnels, and the Novara-Milan line, the High Speed axis from Turin to Salerno was completed. A thousand kilometres of High Speed lines that brings the two ends of the country close, changing the mobility habits of Italians.

2011

ON THE PODIUM IN GERMANY

FS Italiane acquired the Arriva Deutschland Group, today called Netinera: the third largest operator in the passenger transport sector in Germany.

2015

A NEW SPEED RECORD

The "Frecciarossa 1000" train achieved a new record: 390.7 km/h.

2017

THE PILLARS OF THE FUTURE

Ferrovie dello Stato Italiane SpA's Board of Directors approved the Group's 2017-2026 Business Plan, divided into 5 strategic pillars, aimed at making the Group a major international integrated mobility player.

History

- Ferrovie dello Stato Italiane S.p.A. (previously Ferrovie dello Stato, FS) (in English Italian State Railways) is a **government-owned holding company that manages infrastructure and services on the Italian rail network**. One of the subsidiaries of the company, Trenitalia, is the main rail operator in Italy.
- Ferrovie dello Stato (State Railway) was instituted by an act on **22 April 1905, taking control over the majority of the national railways, which were private until then.** The president was nominated by the government.

History

- **With the rise of Fascism, a centralization policy was carried out**. The board of directors and chief administrator office were abolished at the end of 1922. The institution was administered by a commissioner, appointed by the King until April 1924. Since then, Ferrovie dello Stato was managed by the newly born Ministry of Communications (including rail transport), under Costanzo Ciano.
- At the end of 1944, the Ministry of Communications was split and the new Ministry of Transport was created, including the general management of Ferrovie dello Stato, and in 1945, the company was renamed **Azienda Autonoma delle Ferrovie dello Stato**.

History

- The period after World War II was particularly tough for Ferrovie dello Stato, since **most of the Italian rail network was severely damaged and the rolling stock was obsolete**. **The network was rebuilt almost entirely by 1952.** Since then, a period of renewal started. New trains were introduced, among them the ETR 300, and many sections of the national network were electrified and sometimes doubled.
- The newly born Ferrovie dello Stato underwent **major structural transformations** between 1986 and 1992. **The workforce was reduced to half: from 216,310 employees in 1988 to 112,018 in 1999.** Divisions were created to rationalize the management.
- The company was **privatized in 1992** with the creation of the new **Ferrovie dello Stato SpA**, a joint-stock company, following a European guideline. However, the privatization was **only formal**, since shares were still owned by the Italian Government.

Ferrovie dello Stato Italiane S.p.A.

Sede centrale delle Ferrovie dello Stato Italiane a Roma

Stato	Italia
Forma societaria	Società per azioni
Fondazione	1º luglio 1905 a Roma
Fondata da	Governo del Regno d'Italia
Sede principale	Roma

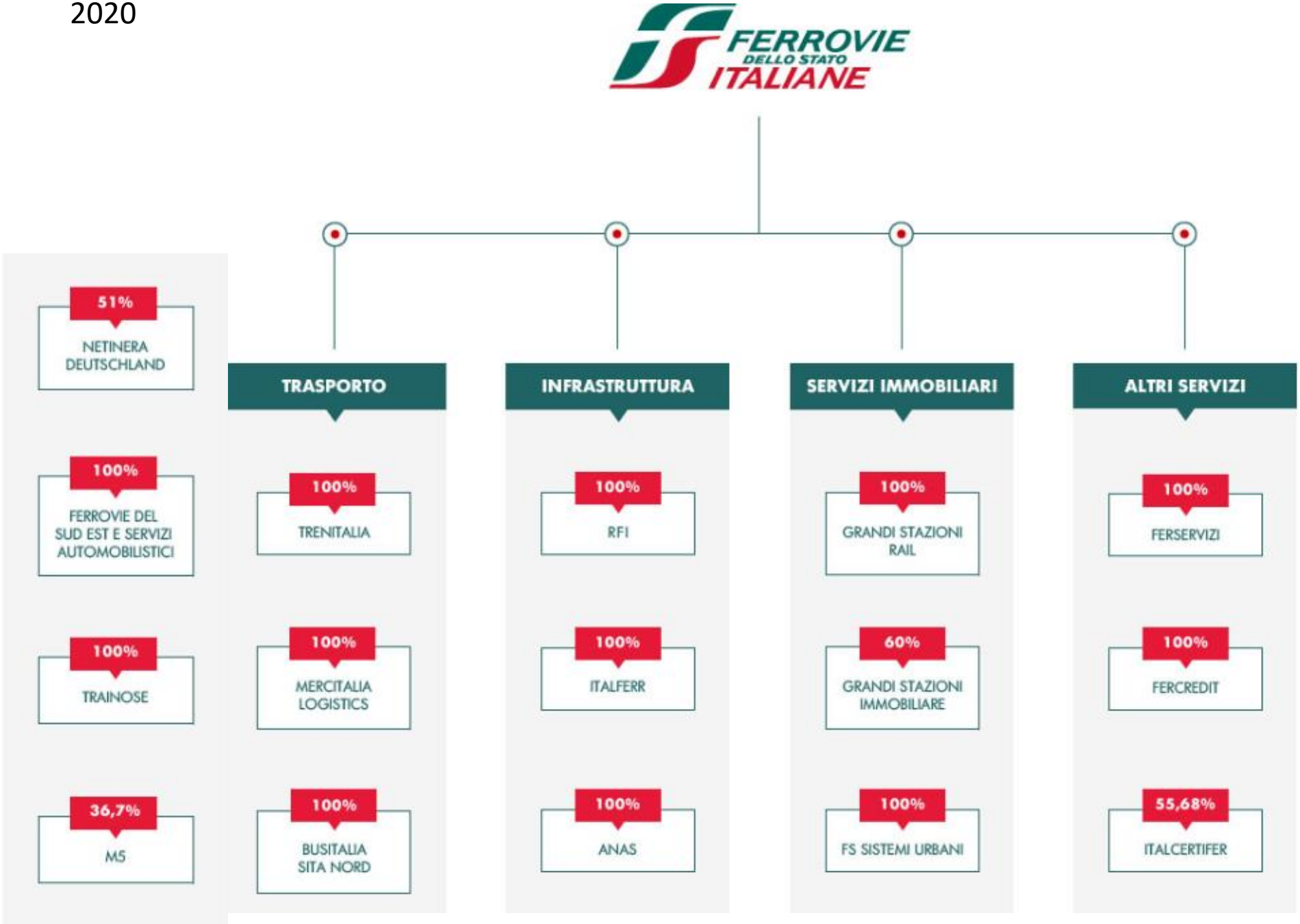
Controllate	• ANAS
	• Busitalia - Sita Nord
	  • Qbuzz
	• c2c
	• Fercredit
	• Ferrovie del Sud Est e Servizi Automobilistici
	• Ferservizi
	• FS Sistemi Urbani
	• Italcertifer
	• Italferr
	• Netinera
	• Nugo
	• TrainOSE
	• Trenitalia
	  • Trenitalia Tper
	  • Trenord al 50%
	• Mercitalia Rail
	  • Mercitalia Shunting & Terminal
	• Rete Ferroviaria Italiana
	  • Grandi Stazioni
	  • Terminali Italia
	• Fondazione FS Italiane

Persone chiave	• Nicoletta Giadrossi (Presidente)[1] • Luigi Ferraris (Amministratore Delegato)[1]
Settore	Trasporto
Prodotti	Trasporto ferroviario
Fatturato	10,837 miliardi di €[2] (2020)
Utile netto	562 milioni €[2] (2020)

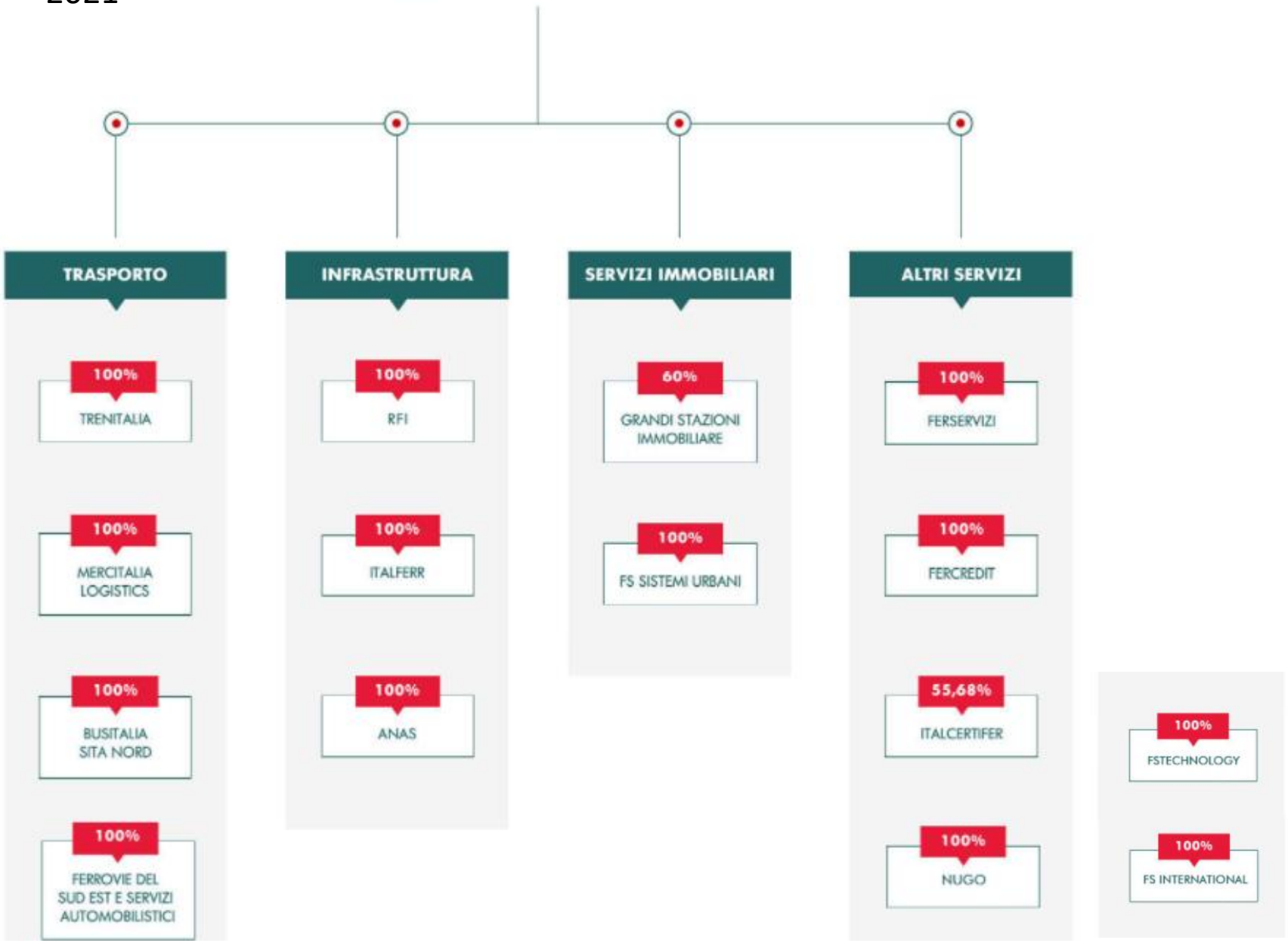
the mission statement

- With the new 2017-2026 Industrial Plan, the FS Group has renewed and strengthened its ambition to carry out works and transport services which can create value for the community in a lasting way, redefining the sector in an **intermodal** way.
- The new strategy which looks to **invest 94 billion euros** in ten years, works on the basis of **five key areas**:
  - integrated mobility, including the involvement of all sector operators;
  - integrated logistics, with a radical reorganization of the goods area;
  - integration between both rail and road infrastructure;
  - international development;
  - digitalization.
- the company is seeking to become an all-around player in mobility.
- **…new, more comfortable** and **technologically advanced trains, modern stations which are increasingly integrated** into the urban fabric, with **road/rail integration. …**

2020


FERROVIE DELLO STATO ITALIANE
TRASPORTO
INFRASTRUTTURA
SERVIZI IMMOBILIARI
ALTRI SERVIZI
51%
NETINERA DEUTSCHLAND
100%
FERROVIE DEL SUD EST E SERVIZI AUTOMOBILISTICI
100%
TRAINOSE
36,7%
M5
100%
TRENITALIA
100%
MERCITALIA LOGISTICS
100%
BUSITALIA SITA NORD
100%
RFI
100%
ITALFERR
100%
ANAS
100%
GRANDI STAZIONI RAIL
60%
GRANDI STAZIONI IMMOBILIARE
100%
FS SISTEMI URBANI
100%
FERSERVIZI
100%
FERCREDIT
55,68%
ITALCERTIFER

2021


FERROVIE DELLO STATO ITALIANE
TRASPORTO
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GRANDI STAZIONI IMMOBILIARE
100%
FS SISTEMI URBANI
ALTRI SERVIZI
100%
FERSERVIZI
100%
FERCREDIT
55,68%
ITALCERTIFER
100%
NUGO
100%
FSTECHNOLOGY
100%
FS INTERNATIONAL

Polo Mercitalia

Il Polo Mercitalia è il raggruppamento delle società del Gruppo FS Italiane che operano nel *business* del trasporto merci e nella logistica.

Il Polo Mercitalia nasce nel 2017 ed è oggi composto da sette società.

- **Mercitalia Logistics**, la capogruppo specializzata nella valorizzazione degli asset immobiliari a destinazione logistica e in attività di logistica integrata;
- **Mercitalia Rail**, la maggiore impresa ferroviaria merci in Italia e una delle principali in Europa;
- **TX Logistik**, la terza più grande impresa ferroviaria merci in Germania, operativa in diversi paesi europei;
- **Mercitalia Intermodal**, il più grande operatore di trasporto combinato strada/rotaia in Italia e il terzo in Europa;
- **Mercitalia Shunting & Terminal**, il "champion" italiano nelle attività di primo e ultimo miglio ferroviario e uno dei maggiori gestori di *inland* terminal in Italia;
- **Mercitalia Maintenance**, specializzata nella manutenzione di carri ferroviari;
- **TERALP** (Terminal AlpTransit), specializzata nella realizzazione di infrastrutture terminalistiche all'avanguardia.

La creazione di un Polo unico per le merci e la logistica ha permesso di ottimizzare i servizi, con un modello operativo coordinato e sinergico che consente al Gruppo FS Italiane di essere competitivo, avere una posizione più rilevante sul mercato e contribuire così allo sviluppo sostenibile del Paese.

Il Polo Mercitalia **sviluppa un fatturato di un miliardo di euro all'anno**, occupa circa 5mila addetti e dispone di una flotta di **circa 26mila vagoni e quasi 700 locomotori**. Le strategie che il Polo Mercitalia metterà in campo per competere sul mercato europeo della logistica e del trasporto merci scaturiscono da un'accurata analisi delle criticità che hanno caratterizzato il comparto merci del Gruppo FS Italiane. La **componente ferroviaria del business** – razionalizzata, efficientata e migliorata nella qualità del servizio – sarà una delle competenze distintive del Polo Mercitalia che concentrerà attenzione e risorse sui grandi **Corridoi ferroviari di traffico transalpino da/per l'Italia,** le **principali dorsali ferroviarie** che collegano il Nord e il Sud dell'Italia, le **interconnessioni** tra le principali aree economiche e i maggiori porti, alcune **importanti relazioni di traffico** tra poli industriali e commerciali del nostro Paese e dei Paesi europei in cui si deciderà di operare, l'allargamento della presenza lungo la catena del valore, a monte e a valle della trazione ferroviaria.

Busitalia - Sita Nord

è attiva nei servizi di trasporto locale in Veneto, Toscana, Umbria e Campania, che gestisce direttamente o attraverso società controllate.

La società ha acquisito Qbuzz, terzo operatore di trasporto pubblico locale in Olanda, attivo nelle aree di Utrecht e Groningen-Drenthe.

Oltre ai collegamenti in ambito urbano, sub-urbano ed extraurbano su gomma, Busitalia gestisce altre modalità di trasporto, tra cui la tramvia di Padova, la ex Ferrovia Centrale Umbra, la navigazione sul lago Trasimeno, la mobilità alternativa nelle città dell'Umbria, nonché alcune linee a libero mercato.

Busitalia partecipa inoltre alla gestione dei City Sightseeing di Firenze, Venezia e Napoli e, tramite la controllata Busitalia Rail Service, organizza, per conto di Trenitalia, servizi sostitutivi e integrativi di corse ferroviarie su tutto il territorio nazionale, compresi collegamenti FrecciaLink.

Ferrovie del Sud Est e Servizi Automobilistici Srl

Ferrovie del Sud Est e Servizi Automobilistici Srl è un operatore di servizi di trasporto di persone e merci su ferrovie, autolinee, tranvie, funivie ed altri veicoli. Nata nel 1931 in Puglia, **FSE** si serve di una rete ferroviaria che conta **474 km di linea**: dopo le Ferrovie dello Stato Italiane (cui è interconnessa), si tratta della rete omogenea più estesa del Paese.

Attraverso le quattro province meridionali della regione, collegando fra loro i capoluoghi di Bari, Taranto e Lecce, nonché 85 comuni del circondario, FSE da più di 80 anni è sinonimo di viaggio in Puglia, in treno o in autobus, per lavoro, studio o turismo. Il servizio di trasporto pubblico viene assicurato anche su gomma, ad integrazione di quello su rotaia, a servizio di oltre 130 comuni, da Bari sino a Gagliano del Capo.

Nel corso del 2016, Ferrovie del Sud Est è entrata a far parte del Gruppo FS Italiane. Confidando nella necessaria collaborazione di tutti gli stakeholder, stiamo esprimendo il nostro massimo sforzo per assicurare ai cittadini pugliesi il progressivo allineamento ai livelli di **qualità**, di **sicurezza** e di **trasparenza amministrativa** che applichiamo ovunque siamo chiamati ad operare.

Metro5 S.p.A.

Metro5 S.p.A. è la società Concessionaria per la **progettazione, costruzione e gestione della Linea**.

Costituita in data 5 giugno 2006, ai sensi dell'art. 37 quinques della Legge 109/94. Metro 5 S.p.A., quale Società di progetto, è subentrata a tutti gli effetti all'A.T.I. aggiudicataria.

La nuova Linea M5 è la prima grande infrastruttura di trasporto urbano in Italia **realizzata in project financing**, strumento che permette la partecipazione finanziaria di privati.

Oltre il 40% dell'opera è stato finanziato con il contributo di Metro 5 S.p.A che ha curato la progettazione, la costruzione e curerà la gestione fino al 2040 attraverso i suoi soci.

Metro5 è costituita da: Alstom Ferroviaria S.p.A., Astaldi S.p.A., ATM S.p.A., Ferrovie dello Stato Italiane S.p.A., Hitachi Rail S.p.A. E Hitachi Rail STSS.p.A.

Anas

Anas è la società del Gruppo Ferrovie dello Stato Italiane che si occupa di infrastrutture stradali. Da quasi un secolo costruisce le strade che connettono ogni località del Paese, le gestisce e le mantiene efficienti nel corso del tempo.

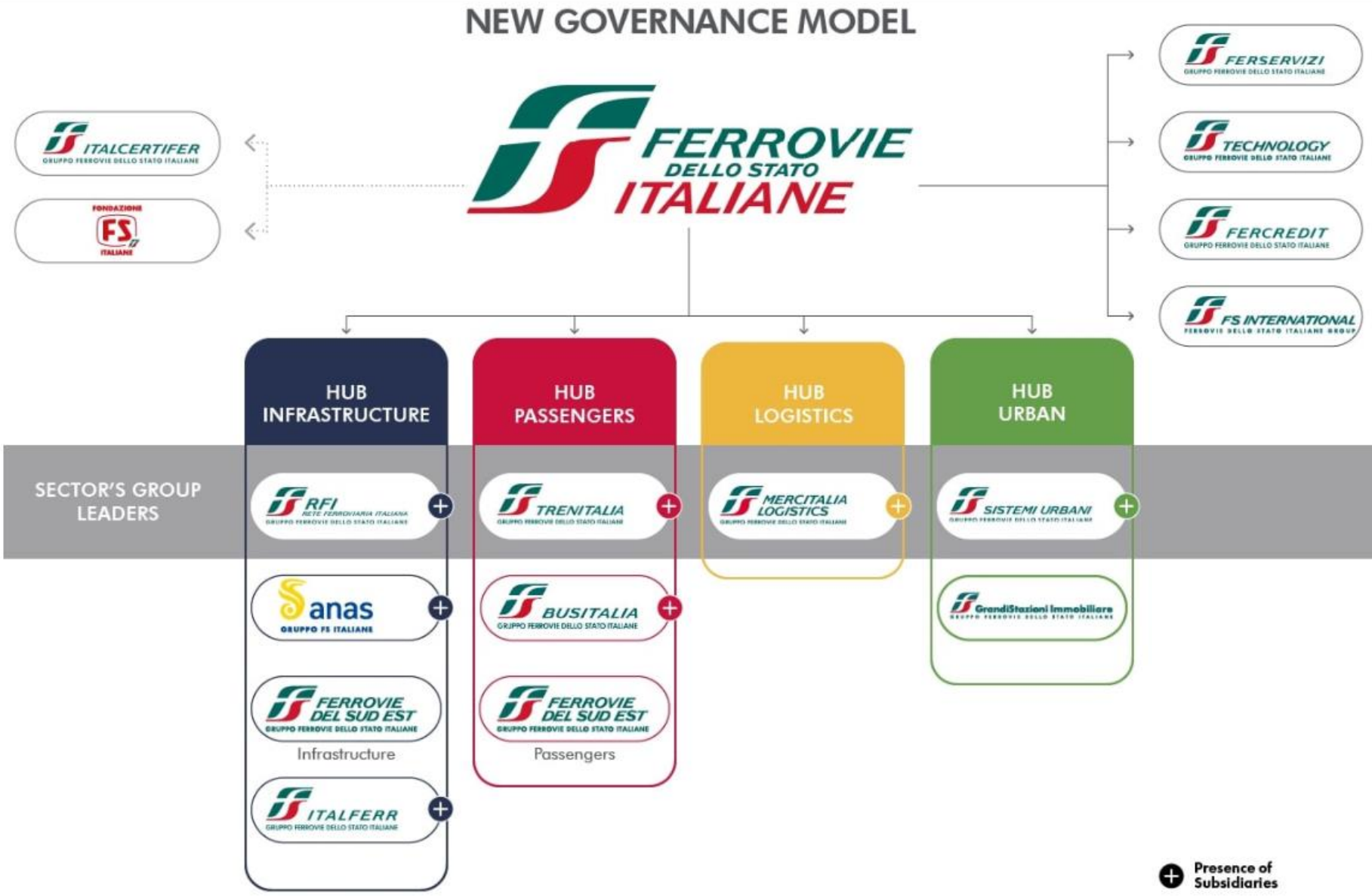
La società è protagonista nel mondo della **progettazione, della costruzione e della manutenzione stradale e tra i leader riconosciuti a livello internazionale**. Gestisce la rete viaria di interesse nazionale, con circa 32 mila km di strade statali, autostrade e raccordi autostradali.

Anas progetta costantemente nuove soluzioni ad alta specializzazione ingegneristica che consentono di risolvere i problemi di connessione su un territorio geologicamente complesso come quello italiano, con oltre 15.500 ponti e viadotti e 2.000 gallerie che rappresentano la metà delle gallerie presenti sull'intero panorama europeo.

Grazie alla sala situazioni nazionale, alle 21 sale operative compartimentali e a una flotta di oltre mille veicoli dotati di localizzatori satellitari e di telecamere, monitora costantemente l'intera infrastruttura stradale del Paese.

Il piano investimenti prevede nel quinquennio interventi per circa 36 miliardi di euro su tutto il territorio nazionale. L'azienda conta circa 6mila dipendenti nelle 38 sedi territoriali ed è presente all'estero attraverso la controllata Anas International Enterprise.

2022


NEW GOVERNANCE MODEL
ITALCERTIFER
FONDAZIONE FS ITALIANE
FERROVIE DELLO STATO ITALIANE
FERSERVIZI
TECHNOLOGY
FERCREDIT
FS INTERNATIONAL
HUB INFRASTRUCTURE
HUB PASSENGERS
HUB LOGISTICS
HUB URBAN
SECTOR'S GROUP LEADERS
RFI
TRENITALIA
MERCITALIA LOGISTICS
SISTEMI URBANI
anas
BUSITALIA
GrandiStazioni Immobiliare
FERROVIE DEL SUD EST
Infrastructure
FERROVIE DEL SUD EST
Passengers
ITALFERR
Presence of Subsidiaries

Rete Ferroviaria Italiana (RFI)

Rete Ferroviaria Italiana (RFI) is the Italian railway infrastructure manager, subsidiary of Ferrovie dello Stato (FS), a state-owned holding company. RFI is the owner of Italy's railway network, it provides signalling, maintenance and other services for the railway network. It also operates train ferries between the Italian Peninsula and Sicily. RFI's origins can be traced back to a series of railway sector reforms enacted by the Italian government during the late 1980s and 1990s. The agency was founded on 1 July 2001 in accordance with a European directive on rail transport that mandated the separation of the infrastructure operator and the service operators. Prior to RFI's creation, the Italian rail network was managed directly by FS.[1] The agency has been periodically accused to a failure to be impartial, including allegations of favouring sibling company Trenitalia over independent operations; the company has been fined in the past for anti-trust breaches. Since its creation, revenue abstraction from access charges have steadily increased, primarily due to the expansion of Italy's high-speed rail network, even as access charges have been decreased.

Services	Rail signalling, maintenance, etc.
Revenue	▼ € 2,491 million[3] (2020)
Net income	▼ € 38 million[3] (2020)
Number of employees	▼ 26,395[3] (2020)
Parent	Ferrovie dello Stato (FS)
Subsidiaries	Grandi Stazioni Rail S.p.A. (100%), Bluferries S.r.l. (100%), Blue Jet S.r.l. (100%), Terminali Italia S.r.l. (100%), Infrarail Firenze S.r.l (100%), TFB Tunnel Ferroviario del Brennero S.p.A. (89,74%), Quadrante Europa Terminal Gate S.p.A. (50%)[3]

Anas S.p.A.

Anas S.p.A. (formerly an acronym for Azienda Nazionale Autonoma delle Strade, English: National Autonomous Roads Corporation) is an Italian company deputed to the construction and maintenance of Italian motorways and state highways under the auditing and technical-operative supervision of the Italian Ministry of Sustainable Infrastructures and Mobility (formerly Italian Ministry of Infrastructure and Transport).

Starting from January 2018, the company is part of Ferrovie dello Stato Italiane.

Products	Motorways construction and maintenance
Revenue	€ 2.343 billion (2020)
Operating income	€ -19.63 million (2020)
Net income	€ -168.76 million (2020)
Total equity	€ 2.442 billion (2020)
Owner	Ferrovie dello Stato Italiane
Number of employees	6,835 (2020)

Ferrovie del Sud Est (FSE)

Ferrovie del Sud Est (FSE) is a railway company in Apulia region, Italy. The company operates in the comuni south of Lecce and in the provinces of Bari, Brindisi and Taranto. The company also operates bus lines. In August 2016 its network was taken over by Ferrovie dello stato due to financial problems at the company. The company is now wholly owned by the Italian Transport Ministry.

Current fleet [edit]

Class	Image	Cars per set	Type
DE.122		N/A	Diesel locomotive
BB.150		N/A	Diesel locomotive
D.343		N/A	Diesel locomotive
D.752		N/A	Diesel locomotive
Ad 31-45		1	Diesel multiple unit
Ad 51-80		1	Diesel multiple unit
Ad 81-88		2	Diesel multiple unit

Italferr

Italferr is a consulting and project company belonging to FS (Ferrovie dello Stato), the Italian railway state company.

Italferr, the Italian State Railways Group engineering firm, operates on the Italian and international markets in the field of railway transport engineering.

In 2014 the company celebrated its first thirty years.

Italferr S.p.A.

Type	Limited company
Industry	Engineering of Transport
Founded	25 October 1984 in Rome
Headquarters	Rome, Italy
Key people	Paola Firmi (President), Andrea Nardinocchi (CEO)
Products	Design, direction and monitoring of works, project management
Revenue	222.7 million €[1] (2020)
Net income	32.2 million €[1] (2020)
Owner	Ferrovie dello Stato Italiane
Number of employees	1,758 [1] (2020)
Website	italferr.it

Trenitalia

Trenitalia is the primary train operator in Italy. A subsidiary of Ferrovie dello Stato Italiane, itself owned by the Italian government, the company was established in 2000 following a European Union directive on the deregulation of rail transport.

Regional trains: they travel within an Italian region or between neighboring Italian regions, and are subsidized by local government at the regional level by "Contratto di servizio“

Long-distance trains and high-speed trains. They are of mainly of two types: the Frecce (arrows) and Intercity trains.

Intercity trains also serve medium-sized cities besides the big cities, thus are generally slower but are cheaper than the Frecce.

Night trains (Intercity night) operate mainly between north and south of Italy and between Italy and its neighbouring countries and are comparable to Intercity level.

Frecciarossa 1000 high-speed train

High-speed rail (managed by RFI) service in Italy commenced in 2008 with about 1,000 km (620 mi) of new track on the Turin-Milan-Bologna-Rome-Naples-Salerno route that allow trains to reach speeds over 360 km/h (220 mph), although current maximum commercial speed is 300 km/h (190 mph). There are currently four generations of ElettroTreno in service on the network.

Trenitalia SpA

TRENITALIA
GRUPPO FERROVIE DELLO STATO ITALIANE

Headquarters of Ferrovie dello Stato Italiane in Rome, Italy

Type	State-owned subsidiary
Industry	Rail transport
Founded	2000
Headquarters	Rome, Italy
Key people	Michele Pompeo Meta (Chairman) and Luigi Corradi (CEO)[1]
Products	Transport
Revenue	▲ €5.3 billion[2] (2017)
Net income	▲ €276.2 million[2] (2017)
Owner	Ferrovie dello Stato Italiane
Number of employees	▼ 27,607[2] (2017)

Recent developments (from the FSI website)

- Another important stage in the renewal process has been the introduction of the new **Busitalia Fast** service. It offers competitive transport services at a domestic and European level, with high levels of safety and innovation. Created with the aim of becoming the main European **player in long-distance mobility by bus**, the service runs daily service to 15 Italian regions and over 90 cities in Italy and Germany, with a fleet of 60 latest-generation buses.
- And then during 2017, the FS Italiane group's rail freight transport and logistics services changed radically with the launch of the **Polo Mercitalia**, a single, large hub that brings together the group companies that operate in this area (Mercitalia Logistics, Mercitalia Rail, Gruppo TX Logistik, Cemat, Mercitalia Transport & Services, Mercitalia Terminal, TerAlp and TLF).

International passenger trains

- Several types of international trains in Italy are usually marketed by separate units, who set ticket prices and service standards but do not operate the trains.
- **TILO**: 50% owned by Trenord (formerly these shares were owned by Trenitalia), **50% owned by the Swiss Federal Railways** The company runs the regional services between Italy and Switzerland. The staff all change at the border and are either FS Trenitalia or SBB CFF FFS.
- **Thello**: is a **private railway service formed as a joint venture with Transdev**. In September 2016, Trenitalia bought out Transdev's 33% shareholding. It operates night trains between Paris Gare de Lyon and Venezia Santa Lucia railway station and daytime trains between Milan and Marseille via Genoa and Nice.
- Trenitalia operates all fast trains to/from Switzerland in the Italian portion of the route.
- **Trenitalia is part of the ILSA consortium with Valencia-based Spanish airline Air Nostrum**. **ILSA was selected by ADIF, the company that runs Spanish rail infrastructure, as the first private operator to be granted access to the Spanish rail market. The Trenitalia consortium will run high-speed services on the Madrid-Barcelona, Madrid-Valencia/Alicante and Madrid-Malaga/Seville lines, branded as IRYO. Services will start running in January 2022. The service contract will have a duration of 10 years. The ILSA consortium will offer 32 daily links with a fleet of 23 trains.**
- In December 2021, Trenitalia launched an open-access service **between Paris and Milan**, using Frecciarossa 1000 trains. Two trains a day, in each direction, run from Gare de Lyon and Milano Centrale with intermediate stops at Lyon Part-Dieu, Chambéry-Challes-les-Eaux and Modane in France and Torino Porta Susa in Italy.
- In August 2019, the **First Trenitalia** consortium was awarded the **West Coast Partnership contract**. Avanti West Coast ran its first train **between London and Manchester** on 8 December.

Mercitalia Group

Mercitalia Rail

Mercitalia Intermodal

Teralp

Mercitalia Shunting & Terminal

TX Logistik

TERMINAL ALPTRANSIT (TerAlp) is the MERCITALIA Group company in charge of setting up latest-generation intermodal terminals in Milan and Brescia.

MERCITALIA SHUNTING & TERMINAL is the company of the MERCITALIA Group managing the Last Mile, specialized in shunting rail and maintenance of rolling stock activities, design, construction and maintenance of railway infrastructure and in the management of intermodal terminals.

TX LOGISTIK is the MERCITALIA Group company that offers rail freight services in several European countries. **TX LOGISTIK** provides integrated transport solutions throughout Europe and push borders back, to offer you new opportunities on the rails.

MERCITALIA RAIL

- **MERCITALIA RAIL** is the MERCITALIA Group company that specialises in rail traction: it is the main rail cargo company in Italy and one of the most important in Europe. **MERCITALIA RAIL** offers a complete range of solutions for conventional and combined transport. Running 2000 trains a week, it provides links to the main ports, interports, terminals and industrial sidings throughout Italy and along international transport corridors, where it works directly or in partnership with other operators. The company offers flexible and customized services to the largest Italian and European operators and, because it is integrated with other MERCITALIA Group companies, completes the range of rail transport options with complementary logistics services.
- **MERCITALIA RAIL** 's sales force is organized in business sectors:
  • **INDUSTRY**, WHICH INCLUDES IRON AND STEEL, CHEMICAL AND AUTOMOTIVE SUPPLY CHAINS
  • **INTERMODAL**, WHICH PROVIDES RAIL AND LOGISTICS SERVICES TO MULTIMODAL OPERATORS (MTO), TO LARGE DOMESTIC AND INTERNATIONAL FREIGHT FORWARDING COMPANIES AND TO PRINCIPAL SHIPPING LINES
  • **GENERAL CARGO**, WHICH IS AIMED AT A VARIOUS RANGE OF SECTORS, INCLUDING: CONSUMER GOODS, RAW MATERIALS, MAJOR INFRASTRUCTURE PROJECTS, MILITARY TRANSPORT AND EXCEPTIONAL LOADS

MERCITALIA INTERMODAL

MERCITALIA INTERMODAL is the MERCITALIA Group company specialised in unaccompanied, combined transport, both inland and maritime, both in Italy and elsewhere in Europe. By developing intermodality, MERCITALIA INTERMODAL is seeking to help:

- IMPROVING THE SAFETY OF FREIGHT TRANSPORT
- INCREASING THE EFFECTIVENESS AND EFFICIENCY OF THE LOGISTICS NETWORK AVAILABLE TO COMPANIES
- MINIMISING THE IMPACT OF FREIGHT TRANSPORT ON THE ENVIRONMENT

MERCITALIA INTERMODAL offers both terminal-to-terminal combined transport services by running a network of multi and single-client shuttle trains, and also door-to-door services.

MERCITALIA INTERMODAL has a wagon fleet for combined transport of around 3,000 platforms, which are used for both Italian and international traffic. The fleet of MERCITALIA INTERMODAL, fully interoperable and innovative, is composed by:

- FLAT WAGONS TO CARRY SWAP BODIES AND CONTAINERS
- LOW FLOOR WAGONS FOR HIGH CUBE UNITS
- POCKET WAGONS FOR CRANABLE SEMI-TRAILERS (INCLUDING MEGA TRAILERS)

International development

The Group exports domestic production to **60 countries** in the **five continents**, where it generates revenues of **over a billion euros,** developing projects for **high-speed trains** and **conventional lines**, through Transport Master Plans, feasibility studies, preliminary and implementation design, work supervision and testing. It also carries out **maintenance** and **network improvement**, **security** (homeland security for railway infrastructure), **training** and operation and maintenance work.

Le Fs si aggiudicano l'alta velocità in Spagna

19:10, 27 novembre 2019
di Gianluca Maurizi

Il consorzio Ilsa, composto da Trenitalia e Air Nostrum, selezionato come primo operatore privato ad accedere al mercato iberico

Fs sbarca in Spagna. Il consorzio Ilsa, composto da **Trenitalia** e **Air Nostrum**, si è aggiudicato i servizi alta velocità Madrid - Barcellona, Madrid - Valencia/Alicante e Madrid - Malaga/Siviglia. L'inizio del servizio commerciale è previsto per gennaio 2022 e avrà una **durata decennale**.

Gianfranco Battisti, amministratore delegato e direttore generale di Fs Italiane.

"Siamo orgogliosi di mettere a disposizione anche in Spagna il know-how sviluppato in 10 anni di alta velocità con 350 milioni di passeggeri trasportati in Italia, unici in Europa in un mercato competitivo. Il Gruppo Fs Italiane è un player internazionale primario, pronto ad affrontare le sfide per le gare nel mercato americano dopo l'aggiudicazione sia dei servizi ferroviari fra Londra ed Edimburgo, operativi dal 9 dicembre in Gran Bretagna, sia del progetto per l'alta velocità in Thailandia", ha aggiunto il manager.

Il consorzio Ilsa offrirà 32 collegamenti giornalieri sulla rotta Madrid - Barcellona (16 in ciascuna direzione). La rotta Madrid - Valencia avrà otto collegamenti al giorno, sette saranno quelli sia fra Madrid e Malaga sia fra la capitale e Siviglia. Da Madrid ad Alicante, invece, ci saranno quattro collegamenti giornalieri, che potranno pero' aumentare durante le settimane estive di punta. Il treno scelto da Ilsa è il Frecciarossa 1000. Le cinque rotte aggiudicate saranno servite grazie a una flotta di 23 treni.

La gara per l'alta velocità spagnola vinta oggi è solo l'ultima di un più ampio piano di sviluppo internazionale del **Gruppo Fs che impiega già l'8,6% della propria forza lavoro fuori dall'Italia, con una quota pari al 15% dei propri ricavi conseguita nei mercati esteri**, pari a 1,4 miliardi di euro. Dall'Arabia Saudita alla Turchia, dagli Stati Uniti all'Algeria, passando per Sud Africa, Russia, Germania e Thailandia: sono una **sessantina i Paesi dove le Ferrovie dello Stato operano tramite partnership, joint venture e la business unit Fs International, creata a giugno 2018 con l'obiettivo di promuovere la vendita del know-how professionale e tecnologico del gruppo all'estero**.

Un successo legato anche al Frecciarossa 1000, il treno di punta della flotta di Trenitalia e il più veloce d'Europa, progettato e costruito secondo le specifiche tecniche di interoperabilità internazionali che gli consentono di poter circolare su più reti europee.

International growth: 13% of total revenue in 2017

Three main directions:

1. The first consists in putting itself forward as a **general contractor**, with the capacity to build railways, especially in countries with a large gap in infrastructure. There are 200 railway companies around the world, but only seven with high-speed lines. FS Italiane thus has a real chance of **exporting its know how.** The priority areas for international expansion are the **Middle East** (Iran, Saudi Arabia, Oman), **India** and **South-East Asia** (Malaysia, Thailand, Singapore, Vietnam), the **Americas** (Brazil, Argentina, Colombia, Peru, the US, and Canada) and **Africa** (Ivory Coast, Congo and South Africa).
2. The second looks to the growth of the **market for rail services abroad**. Trenitalia can export the very high-quality level of travel that it now has on its high-velocity network. As well a strengthening of **existing cross-border** relationships (for example the Thello services to France, the Venice – Ljubljana – Belgrade service or new traffic with Switzerland following the opening of the Gotthard and Ceneri base tunnels) there will be a focus on the most interesting **European routes**: **Paris – Brussels, Paris, Paris – Bordeaux, Hamburg – Cologne, Milan – Zurich – Frankfurt** (a link that will start at the end of 2017 and will cross three countries), **Athens – Salonica** (thanks to the purchase of Trainose) and **London – Edinburgh**. All of this is because of the liberalisation of European railways which will start in 2020 because of the **Fourth Railway Package**.
3. The last involves the **international development of TPL**, which will be mainly achieved using the group's presence abroad. The aim is to find rail/road integration opportunities for passenger transport in the cities served by the infrastructure work done by the group.

International actitivities: details

Europa

In **Francia** il Gruppo Ferrovie dello Stato, tramite la controllata Trenitalia, possiede il 100% di Trenitalia-Veolia Transdev che opera con il servizio Thello nel settore dei treni notturni tra la Francia e l'Italia. Obiettivo della società italo-francese è quello di espandersi nei servizi ad alta velocità in Europa.

In **Germania** il Gruppo FS possiede Netinera la seconda impresa ferroviaria privata dopo Veolia Verkehr. Sempre nel paese tedesco Trenitalia (una controllata del Gruppo FS) ha comprato l'impresa ferroviaria TX Logistik che opera nel trasporto merci a lunga percorrenza.

In **Grecia** a partire dal 14 luglio 2016 è in corso la trattativa per l'acquisizione da parte del Gruppo FS della società di trasporto ferroviario TrainOSE, il corrispettivo greco di Trenitalia

In **Repubblica Ceca**, Grandi Stazioni si occupa della ristrutturazione e della valorizzazione delle stazioni di Praga, Karlovy Vary e Mariánské Láznĕ.

In **Romania**, Italferr sta fornendo i suoi servizi di ingegneria alle ferrovie rumene- Trenitalia invece sta aiutando le *Căile Ferate Române* a redigere i contratti di servizio con lo Stato.

In **Serbia** **e** **Montenegro**, Italferr, insieme alla società di ingegneria ferroviaria Serba CIP, ha intrapreso uno studio per l'ammodernamento di oltre 450 km di linea ferroviaria, di cui 290 in Serbia e 165 in Montenegro.

In **Serbia**, Italferr ed un'associazione temporanea di imprese sta realizzando un sistema informatizzato (RMS – Railway Management System) per la gestione, la diagnosi e la manutenzione dell'infrastruttura ferroviaria.

In **Polonia**, Trenitalia, possiede per il 50% Pol-rail una società operante nel trasporto di merci su rotaia che negli ultimi anni si è espansa molto diventando una delle principali aziende del settore nel centro Europa. La crescita dell'azienda ha spinto gli azionisti a creare una società in Romania denominata Rom-Rail.

Africa

In **Egitto**, Italferr, si è aggiudicata dal Ministero dei trasporti egiziano lo studio di prefattibilità di una linea ad Alta Velocità della lunghezza di circa 220 km per collegare Cairo e Alessandria. Inoltre sempre Italferr sta aiutando il difficile risanamento delle ferrovie egiziane.

In **Algeria**, Italferr, è stata incaricata dal ministero dei trasporti algerino di riorganizzare l'intero settore ferroviario del Paese

In **Marocco**, il Gruppo FS, collabora con le ferrovie locali nella programmazione degli investimenti per la modernizzazione della rete ed aiuta a formare il personale sia tecnico che amministrativo.

In **Libia**, il Gruppo FS Ha firmato un accordo di cooperazione con le Ferrovie libiche per lo sviluppo dell'infrastruttura e dell'impresa ferroviaria.

Asia

In **Turchia**, il Gruppo FS, fornisce supporti tecnici ed ingegneristici alle ferrovie turche (*Türkiye Cumhuriyeti Develet Demiryollari*) per lo sviluppo delle infrastrutture ferroviarie nel Paese e svolge le analisi di mercato nel settore delle merci. per la progettazione di due impianti di manutenzione per i treni alta velocità. FS ha anche collaborato per la realizzazione della ferrovia ad alta velocità Istanbul–Ankara.

In **Siria**, Italferr sta lavorando ad uno studio di fattibilità per il potenziamento infrastrutturale e tecnologico della linea Aleppo – Damasco, principale asse ferroviario della Siria

In **Iraq**, il Gruppo Ferrovie dello Stato, è stato incaricato di redigere il Piano Nazionale dei Trasporti.

In **India**, Grandi Stazioni insieme a Tata Group, ha vinto la gara per la ristrutturazione della stazione di Nuova Delhi

In **Kazakistan**, il Gruppo FS insieme ad Ansaldo STS, ha firmato un memorandum d'intesa sulla ristrutturazione delle ferrovie kazake.

America del Sud

In **Venezuela**, Italferr, sta lavorando per la progettazione di nuove linee ferroviarie destinate prevalentemente al servizio merci.

In **Uruguay**, FS, collabora nella ristrutturazione della rete e del materiale rotabile.

Busitalia - Sita Nord S.r.l.

Busitalia - Sita Nord S.r.l. is an Italian company, wholly owned by Ferrovie dello Stato Italiane, concessionaire, also through its subsidiaries, for the management of the local public transport service in various Italian cities in Campania, Umbria and Veneto as well as in the Netherlands through Qbuzz. Occasionally it also manages replacement bus services on behalf of Trenitalia, another company in the group.

Busitalia - Sita Nord	
BUSITALIA NORD GRUPPO FERROVIE DELLO STATO ITALIANE	
Stato	Italia
Forma societaria	Società a responsabilità limitata unipersonale
Fondazione	19 maggio 2011 a Firenze
Fondata da	Ferrovie dello Stato Italiane
Sede principale	Firenze
Gruppo	Ferrovie dello Stato Italiane
Controllate	• ATAF Gestioni – 70% • Busitalia Campania – 100% • Busitalia Veneto – 78,78% • Busitalia Rail Services – 100% • City Boat – 25% • Qbuzz – 100% • Qbuzz Mobility Service – 100% • SAVIT – 100%[1]
Persone chiave	• Paolo Colombo (presidente)
Settore	Trasporto
Prodotti	Trasporto pubblico locale
Utile netto	- 21,279 milioni €[2] (2020)
Dipendenti	1 746[2] (2020)
Sito web	www.fsbusitalia.it

FS group: struggling to make a profit

Tabella 6 – Indicatori di bilancio relativi a Ferrovia dello Stato spa (fonte: Bilancio consolidato, anni vari)

Indicatori di bilancio	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*
Ricavi operativi	6.650	6.718	6.875	6.703	7.685	7.816	7.982	8.064
Costi operativi	6.008	6.158	6.747	6.703	7.222	6.781	6.532	6.404
Margine operativo lordo (EBITDA)	642	560	128	-650	463	1.035	1.450	1.660
Risultato operativo (EBIT)	-	4	-374	-1.354	-575	106	435	508
Risultato netto	31	125	-465	-2.115	-409	16	54	129
Capitale investito netto	42.203	49.316	56.487	45.461	42.757	45.420	46.026	46.592
Patrimonio netto	33.465	35.998	38.539	36.444	36.016	36.210	36.372	36.520
Posizione finanziaria netta	8.738	13.318	17.948	9.017	6.741	9.210	9.654	10.072
Debt/Equity	0	0	0	0	0	0,25	0,27	0,28
Investimenti tecnici del periodo	7.208	8.447	8.528	7.263	6.864	6.096	5.250	4.143
Personale (consistenza media)	100.784	99.305	97.599	98.447	96.187	91.442	87.422	82.566
Margine operativo lordo/ricavi operativi	9,7%	8,3%	1,9%	-9,7%	6,2%	13,2%	18,2%	20,6%
Ros (risultato operativo/ricavi operativi)	0,0%	0,1%	-5,4%	-20,2%	-7,5%	1,4%	5,5%	6,3%
Costo del personale/ricavi operativi	67%	67%	67%	70%	61%	58%	57%	54%
Ricavi operativi per addetto	115	119	123	121	141	151	162	173
Unità di traffico per addetto	106	109	110	112	122	128	123	119
Costo del personale per addetto	106	109	114	117	120	122	128	128
Treni-km per km di rete	99	103	101	103	102	99	94	94

Recent Balance sheets: a profitable group?

Anno	Risultato netto di esercizio (in milioni di €)	Margine Operativo lordo EBITDA (in milioni di €)	Risultato operativo EBIT (in milioni di €)	Patrimonio netto consolidato (in miliardi di €)	Dipendenti gruppo (unità)
2021[46]	193	1.888	193	41.546	81.906
2020[47]	-562	1.633	-278	41.247	81.409
2019[48]	593	2.609	829	41.842	83.764
2018[49]	559	2.476	714	41.697	82.944
2017[50]	552	2.313	718	38.630	74.436
2016[51]	772	2.293	892	38.412	70.180
2015[52]	464	1.975	644	37.836	69.002
2014[53]	303	2.113	659	37.318	69.115
2013[54]	460	2.030	818	37.154	69.425
2012[55]	381	1.918	719	36.401	71.930
2011[56]	285	1.804	664	36.423	73.616
2010[57]	129	1.660	508	36.177	80.153
2009[58]	44	966	143	36.244	84.963
2008[59]	16	1.035	106	36.210	89.431
2007[60]	409	463	575	36.016	93.573
2006[61]	-2.115	650	1.354	36.322	98.002
2005[62]	465	128	374	38.539	97.599
2004[63][64]	125	560	4	35.998	99.305
2003[63][64]	31	642	0	33.465	100.784

Tab. IV.1.1.8 - Consistenza del personale del Gruppo FS Italiane - Anni 2001, 2005, 2010, 2015, 2017-2020

Personale	2001	2005	2010	2015	2017	2018	2019	2020
A fine anno	102.982	97.599	80.153	69.002	74.436	82.944	83.764	81.409
Media annua	109.922	99.057	82.566	69.276	72.441	81.662	83.181	81.838

Fonte: Gruppo Ferrovie dello Stato Italiane.

Tab. IV.1.1.9 - Indicatori di produttività del Gruppo FS Italiane - Anni 2001, 2005, 2010, 2015, 2017-2020

	2001	2005	2010	2015	2017	2018	2019	2020
Unità di Traffico per addetto *(migliaia)*	663	709	754	906	959	926	919	538
Treni-km per addetto *(unità)*	2.950	3.417	3.923	4.914	4.881	4.854	4.811	3.949

Fonte: Gruppo Ferrovie dello Stato Italiane.

Tab. IV.1.1.11 - Investimenti delle principali società del Gruppo - Anno 2020

Milioni di euro

RFI		Trenitalia		Mercitalia Rail	
	milioni €		milioni €		milioni €
Rete convenzionale	4.258	Passeggeri Nazionale/Internazionale	166	Merci	29,5
Rete Alta Velocità	659	Passeggeri Regionale	691		
		Altri	183		
		Manutenzione incrementativa	320		
Totale	**4.917**		**1.360**		**30**

Fonte: Gruppo Ferrovie dello Stato Italiane.

High speed rail: a new entrant NTV

5 main routes, 56 daily trains serving 13 cities and 18 stations:

- **Torino - Milano - Bologna - Firenze - Roma - Napoli – Salerno**
- **Venezia - Padova - Ferrara - Bologna - Firenze - Roma - Napoli - Salerno**
- **Brescia - Verona - Bologna - Firenze - Roma - Napoli**
- **Torino - Milano - Brescia - Verona - Vicenza - Padova – Venezia**
- **Bolzano - Trento - Verona - Bologna - Firenze – Roma.**

Italo - Nuovo Trasporto Viaggiatori S.p.A.

ntv

Nuovo Trasporto Viaggiatori

Fatturato	369 mln €[1] (2016)
Utile netto	20 mln €[1] (2016)
Dipendenti	1960 (2018)

On 7 february 2018 Italo is sold to the American Global Infrastructure Partners for 1,98 billion euros.

Impact of HS rail competion

Da «Concorrenza ad alta velocità», di Ugo Arrigo, 17.04.18, La voce.info

- **Increase supply of rail services**
- **Increased demand and load factor (76% almost equal to low cost air carriers)**
- **Lower ticket prices (average revenue per passenger lower than European conterparts)**

Freight rail transport: many operating companies

Rail Traction Company SpA	23-06-2000	merci	operativa	Verona	
Hupac SpA	14-05-2001	merci	operativa	Milano	Gruppo SBB
Captrain Italia Srl	20-12-2001	merci	operativa	Milano	ex Monferail Srl., poi SNCF Fret Italia
SBB Cargo Itaia Srl	26-03-2003	merci	operativa	Gallarate	ex Swiss Rail Cargo Italy
DB Cargo Italia	23-05-2003	merci	operativa	Milano	ex NordCargo, poi DB Schenker Rail Italia
Rail Cargo Carrier Italy Srl	11-08-2006	merci	operativa	Alessandria	ex Tiberco, poi Linea S.p.A., poi Rail Cargo italia, Gruppo ÖeBB
Crossrail Italia S.r.l.	22-03-2007	merci	operativa	Scalo Domo 2	Partecipata GTS
Oceanogate Italia S.r.l.	01-06-2008	merci	operativa	La Spezia	Gruppo Contship
ISE Servizi	01-09-2008	merci	operativa	Maddaloni	Ex Rail Italia Srl
Interporto Servizi Cargo Srl	11-05-2009	merci	operativa	Napoli	
Fuori Muro Srl	13-01-2011	merci	operativa	Genova	Gruppo InRail
Dinazzano Po	15-10-2012	merci	operativa	Reggio Emilia	Gruppo TPER
Adriafer	03-02-2014	merci	operativa	Trieste	Porto di Trieste
Trenitalia SpA	23-05-2000 (1) 24-10-2012 (2)	merci e passeggeri	operativa	Roma	Gruppo FSI
Trenord SpA	23-06-2000 (1) 18-10-2011 (2)	merci e passeggeri	operativa	Milano	ex FNME, poi FNMT, poi TLN
Trasporto Ferroviario Toscano SpA	13-03-2001 (1) 23-05-2012 (2)	merci e passeggeri	operativa	Arezzo	ex La Ferroviaria Italiana

A European perspective

Rail transport in Europe

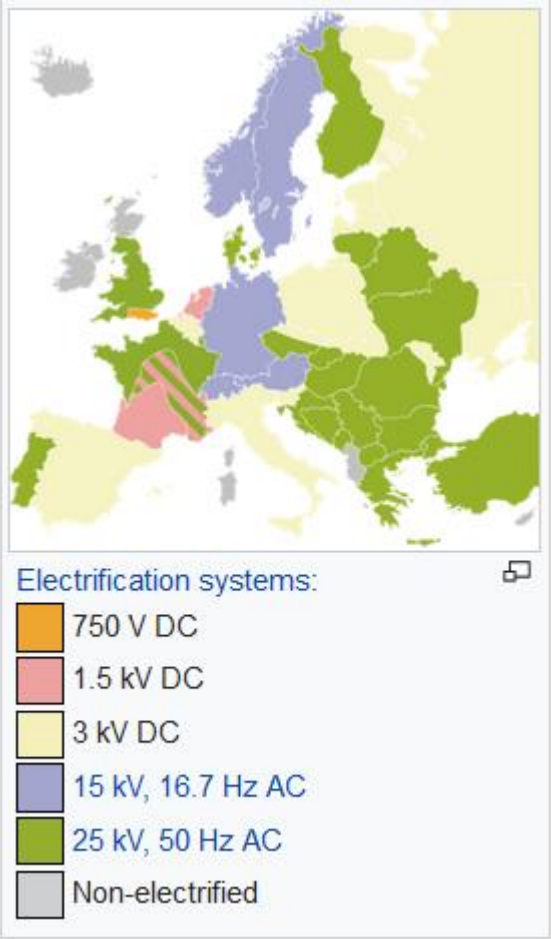
- Rail transport in Europe is characterized by its diversity, both technical and infrastructural.
- The European Union aims to make cross-border operations easier as well as to introduce competition to national rail networks.

Differences in guage

- While most railways in Europe use 1,435 mm (4 ft 8 1⁄2 in) **standard gauge**, in some other countries, like Spain or countries which territories used to be a part of Russian Empire and Soviet Union, widespread broad gauge exists. For instance in Spain it is 1,668 mm (5 ft 5 21⁄32 in) (also known as **Iberian gauge**), while in Russia, Ukraine, Belarus, Finland, Baltic states gauge width is 1,520 mm (4 ft 11 27⁄32 in) or 1,524 mm (5 ft) (also known as **Russian gauge**). Ireland uses the somewhat unusual 5 ft 3 in (1600mm) gauge, which is referred to in Ireland as "**Irish Gauge**".

Differences in electrification

Likewise, electrification of lines varies between countries. 15 kV AC has been used in Germany, Austria, Switzerland, Norway and Sweden since 1912, while the Netherlands uses 1500 V DC, France uses 1500 V DC and 25 kV AC, and so on. All this makes the construction of truly pan-European vehicles a challenging task and, until recent developments in locomotive construction, was mostly ruled out as being impractical and too expensive.



European railway packages

- The **First Railway Directive** 91/440/EC (with amendments, also called the "First Railway Package") is an EU directive that sets out an **EU law framework and requirements** for railways in the EU to allow **open access operations on railway lines** by companies other than those that own the rail infrastructure. The legislation was further extended by further directives to include **cross border transit of freight**.
- The **Second Railway Package** is a group of European Union legislation which promote **common standards and open access**, working towards an integrated European railway area. Regulation 881/2004 created the **European Railway Agency**, to coordinate safety and interoperability efforts.

European railway packages

- The third railway package intended to revitalize railways across Europe and open up passenger services to competition. (**harmonized licenses for train drivers, open access, and subsidized public services, rail passengers rights**)
- The fourth railway package covers **standards and authorization for rolling stock; workforce skills; independent management of infrastructure; and the liberalization of domestic passenger services in an attempt to reduce European rail subsidies.** The package is another attempt at reforming a rail sector still dominated by **state-owned railway businesses that control both the tracks and the trains**. It has been watered down: instead of requiring infrastructure and train operations to be completely separate businesses, it permits them to be owned by a single holding company. Responsibility for authorizing rolling stock to use a network would be shifted towards the European Railway Agency.

Vertical integration or separation of tracks from trains?

The Separated Model.

The Models of Management of Railway Companies in the European Union: Holding, the German Experience

Vilius Nikitinas[a]*, Stasys Dailydka[b]

- **complete separation of infrastructure and transportation services**, i.e. **institutional and factual** separation of infrastructure and transportation services into separate legal persons that are not interrelated (**Sweden, Great Britain**).
  - As a separate option of this model should be mentioned the structure when railway transportation activity is completely separated from railway infrastructure management, but the infrastructure is managed and administered not by one company but by several independent companies, which ensure e.g. infrastructure planning, infrastructure maintenance, infrastructure capacity distribution and collection of charges (**Holland**).

The Integrated Model

- A vertically integrated model, i.e. a **holding structure**, when railway infrastructure is managed by a separate legal person holding its own accounts, budget and independent financial results, but which together with the companies providing communication services belongs to one group of companies (**Germany, Italy, France, Austria**).
  - One should note that although companies belong to the same group of companies, **infrastructure manager does not have a right to provide advantage to the companies of the group over other companies** providing railway transportation services

Vertical integration or separation of tracks from trains?

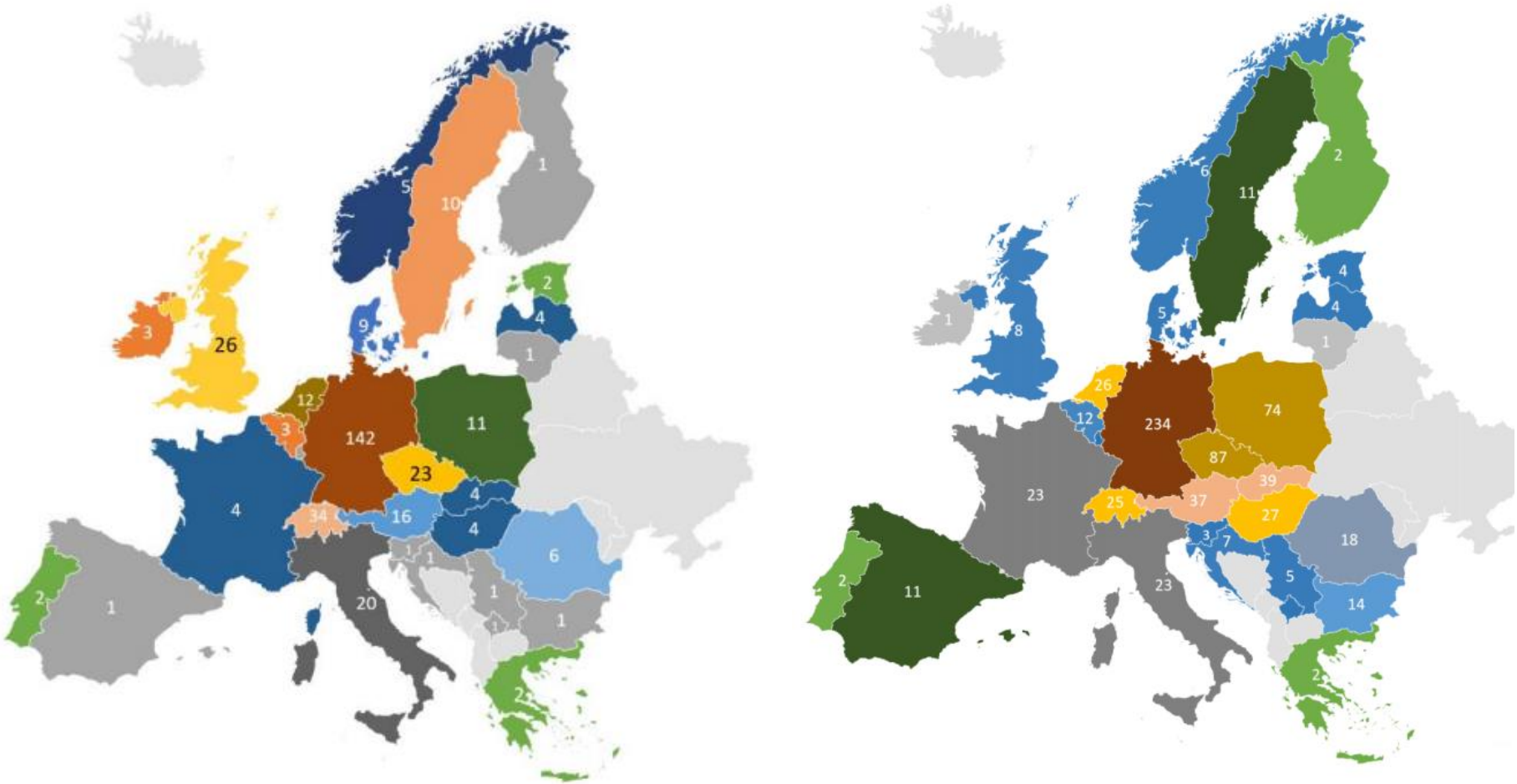
Different countries have taken different approaches, and they have yielded different results.

- Japan and the U.S. have both found success with a vertically integrated model. The U.S. freight sector has prospered since deregulation 30 years ago, with **freight companies owning their own tracks and running their own trains**, while Japan split its national railway company into **six different companies, each with their own regions**.

The opinion of Fumitoshi Mizutani and Shuji Uranishi in the *Journal of Regulatory Economics* "If a rail organization has **lower train density**, the **vertical separation policy** is reasonable," they conclude. "However, a rail organization with **higher train density**" — with networks in Germany, Switzerland, Japan, South Korea and the Netherlands qualifying — "should take a **vertical integration policy**."

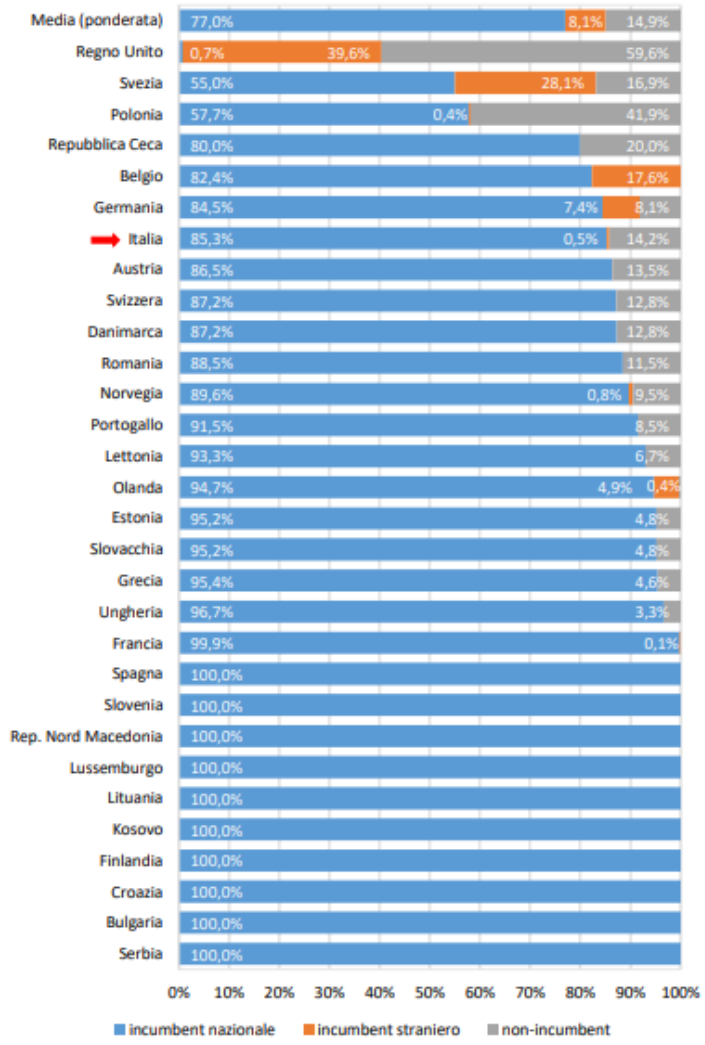
"In the case of lower train density, as trains are operated on tracks, the **coordination cost** is low between the operation company and the infrastructure company. "

Numero di imprese ferroviarie nel settore passeggeri e merci, 2018



SETTIMO RAPPORTO ANNUALE AL PARLAMENTO ART (2020)

Figura 57. Ripartizione del comparto passeggeri (passeggeri-km) tra imprese ferroviarie per tipologia, 2018



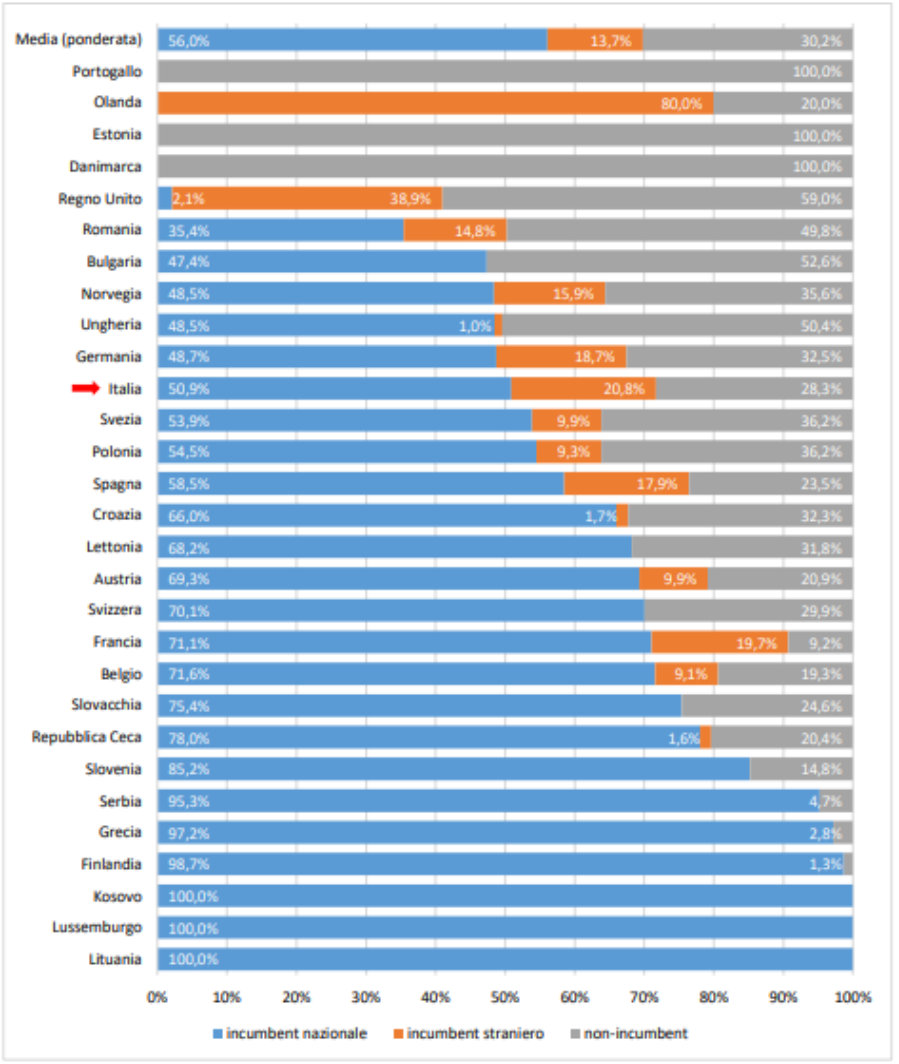
La domanda di traffico, nel comparto passeggeri e merci, nei paesi europei monitorati viene rappresentata nella Figura 57 e nella Figura 58; si distingue la distribuzione della domanda, ripartita percentualmente tra l'impresa storica nazionale (*incumbent nazionale*), le imprese storiche straniere (*incumbent straniero*) e le altre imprese (*non-incumbent*).

Nel comparto passeggeri l'Italia presenta circa l'85% della domanda in capo all'operatore storico nazionale, mentre in quello delle merci è circa il 50%.

I dati in valore assoluto della domanda di traffico passeggeri e merci sono riportati in Tabella 13 e Tabella 14.

Fonte: Elaborazione ART su dati IRG-*Rail*, *Ottavo Rapporto Annuale Market Monitoring*, 2020.

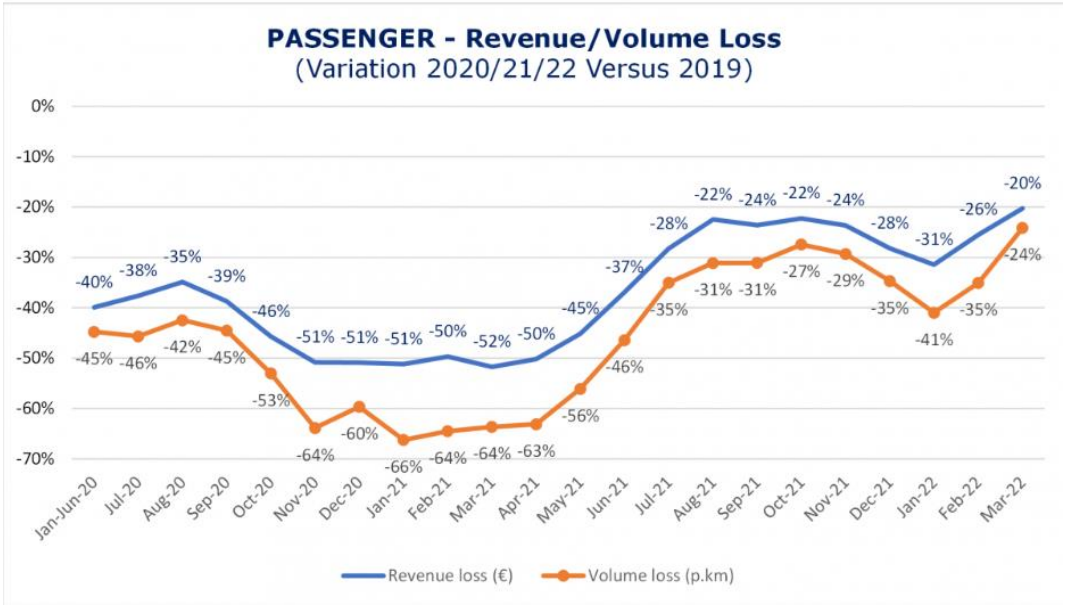
Figura 58. Ripartizione del comparto merci (tonnellate-km) tra imprese ferroviarie per tipologia, 2018



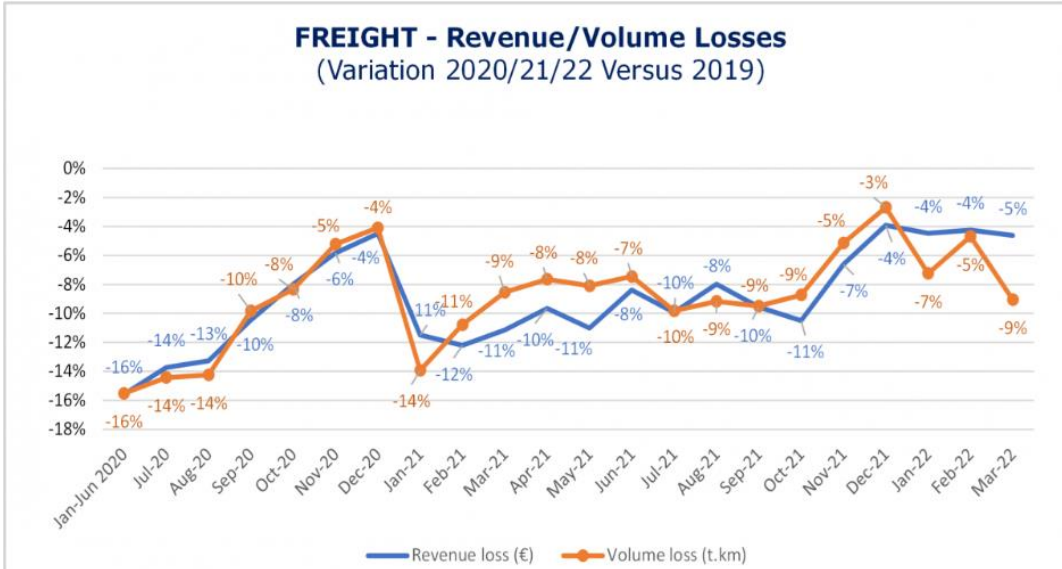
Fonte: Elaborazione ART su dati IRG-*Rail*, *Ottavo Rapporto Annuale Market Monitoring*, 2020.

European rail traffic on the rise again, but not yet back to normal

Published on 31-05-2022 at 11:37



Passenger volumes are still down by 24 per cent on average in March 2022, compared to March 2019, a year before the pandemic hit Europe. This is the highest level of passenger volumes since the beginning of the crisis, while revenues are currently down by 20 per cent. In some countries, particularly in Eastern Europe revenues continue to remain low however, while passenger-kilometres have indeed also increased. This may be linked to the influx of Ukrainian refugees permitted free travel on their migration path towards the West,



Rail freight volumes have bounced back more, but are also still 10 per cent below the volumes compared to March 2019. Freight volumes almost reached pre-crisis levels in December, but then dropped again in March to -9 per cent. Revenues however almost stabilised to their pre-crisis level between December 2021 and March 2022, now being 5 per cent lower than before the pandemic.

Conclusions

- An important and complex sector
- Market structure: monopoly or oligopoly
- Passengers: it satifies the short to medium range mobility needs
- Freight: bulk, low value cargo over long distances
- High public investments
- Tendency of the national monopolies to explore other areas of business (buses, logistics)
- Still many obstacles to a European competition or integration, but the competetion among «the national champions» (former monopolists) is increasing