Impact of COVID-19 on Rail

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Impact on global consumer behaviour

Interaction between consumers and producers is expected to change significantly

Supply chains need to adapt and be more flexible.

Share of eCommerce soared in these markets:

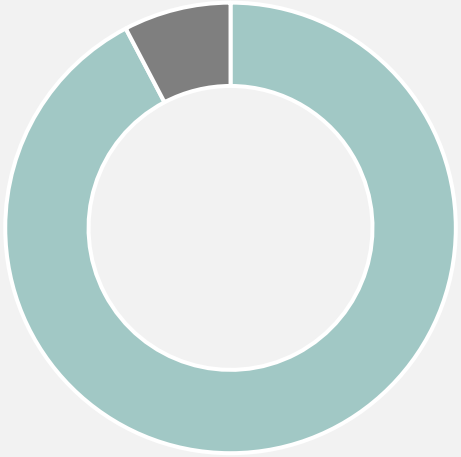
- Italy
- China
- The United States
- France
- Germany
- Sweden

Takeaways

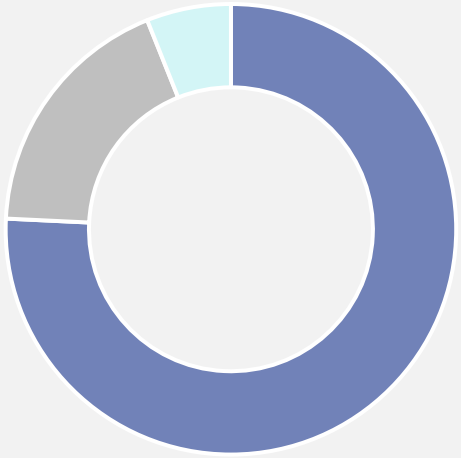
- Traffic of passengers and goods can suffer serious setbacks with implication on a global scale.
- In the "new normal", the transportation sector will continue playing a fundamental role. However, it will be necessary to transform and adapt transportation to allow full recovery.

Impact on the transport sector - Europe

	Growth estimation 2010 – 2050	Impact of COVID-19 Pandemic
Passengers Transport	+42%	Partially/Entirely **closed**
Freight	+60%	Severe **setbacks** in almost every sector



- In 2016, more than 92% of the entire passenger transport moved on the roads.
- In 2017, more than 1 billion passengers travelled by air, with annual passenger increment estimated around 3.5% each year.



- In 2018, road transport accounted for more than 75% of the total inland freight transport, followed by rail (18%) and inland waterways transport (6%).

Source: Eurostat

Impact on the transport sector - Europe

	COVID-19 impact on **passengers**	COVID-19 impact on **freight**
Air Transport	Nearly all passenger fleet grounded, some aircraft deployed as freighters.	The crisis has highly limited the airfreight capacity. For example, capacity between China and Europe diminished of 60%.
Road Transport	Closed borders and sanitary measures forced a nearly-complete halt to intra-region mobility.	Land transport has been subjected to disruptions and slowdowns, as a result both of border controls for sanitary measures and driver's unavailability.
Maritime Transport	N/A	Europeans port are expected to be running at 20-30% of their full capacity in the coming months. The demand for ocean liners with a capacity of ten thousand containers is expected to decrease sharply.
Rail Transport	Closed borders and sanitary measures forced a nearly-complete halt to passenger services.	**Long-distance trans-Eurasian rail lines are benefiting from the crisis**. The crisis increased air shipping prices and transit times in air and ocean freight, thus boosting railways' **competitivity**.

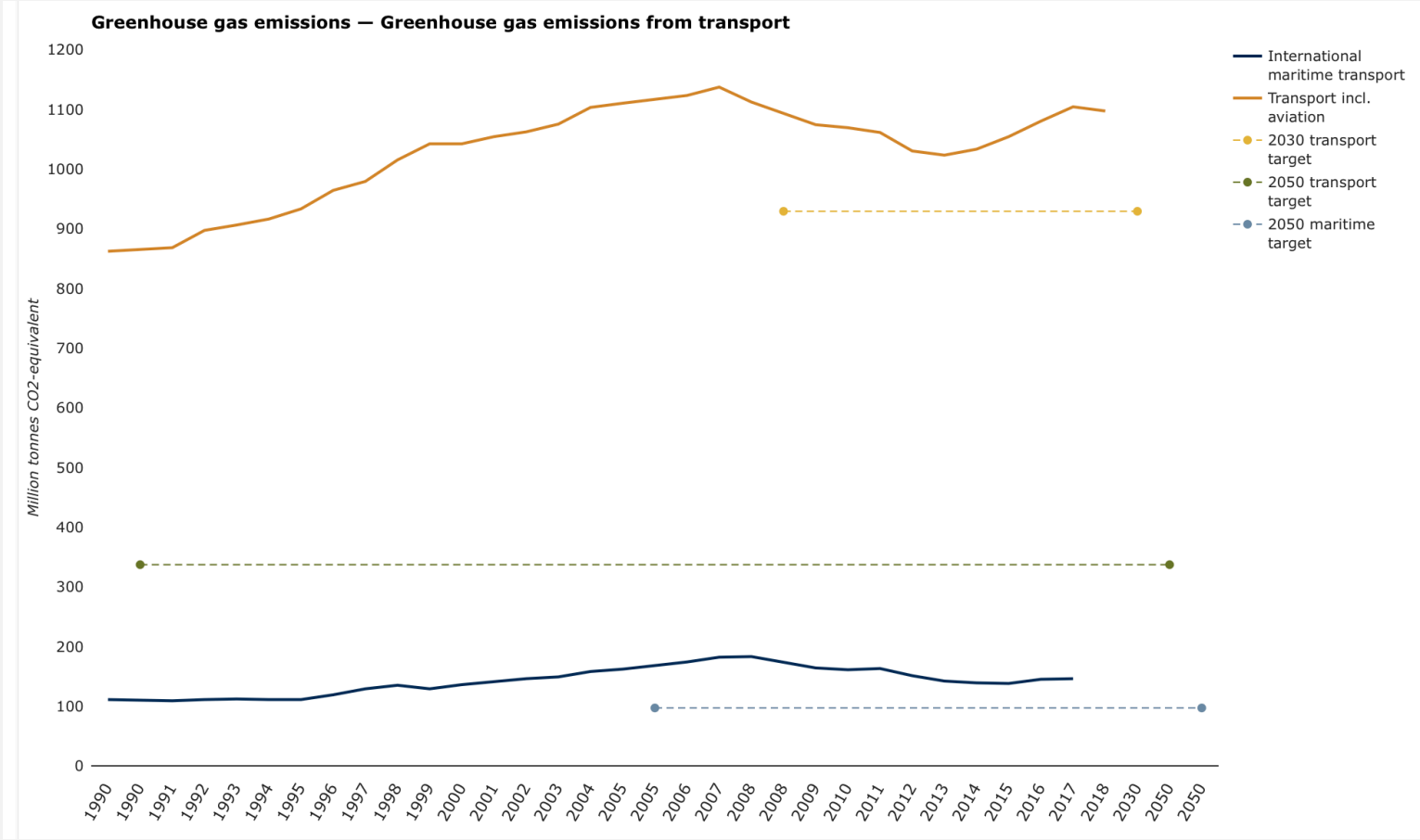
Impact on environment

Context

- European policies for clean transport did not achieve reduction in GHG emissions

Observations

- Preliminary data show reduction in air pollution in Europe due to COVID-19 impact on transport and productive activities.
- GHG emissions are expected to rise again after the pandemic with a rebound effect like after the 2008 financial crisis.
- Once the virus disappears, the containment measures will be dismissed and GHG emission will continue rising



Source: EEA

Impact on environment

Takeaways

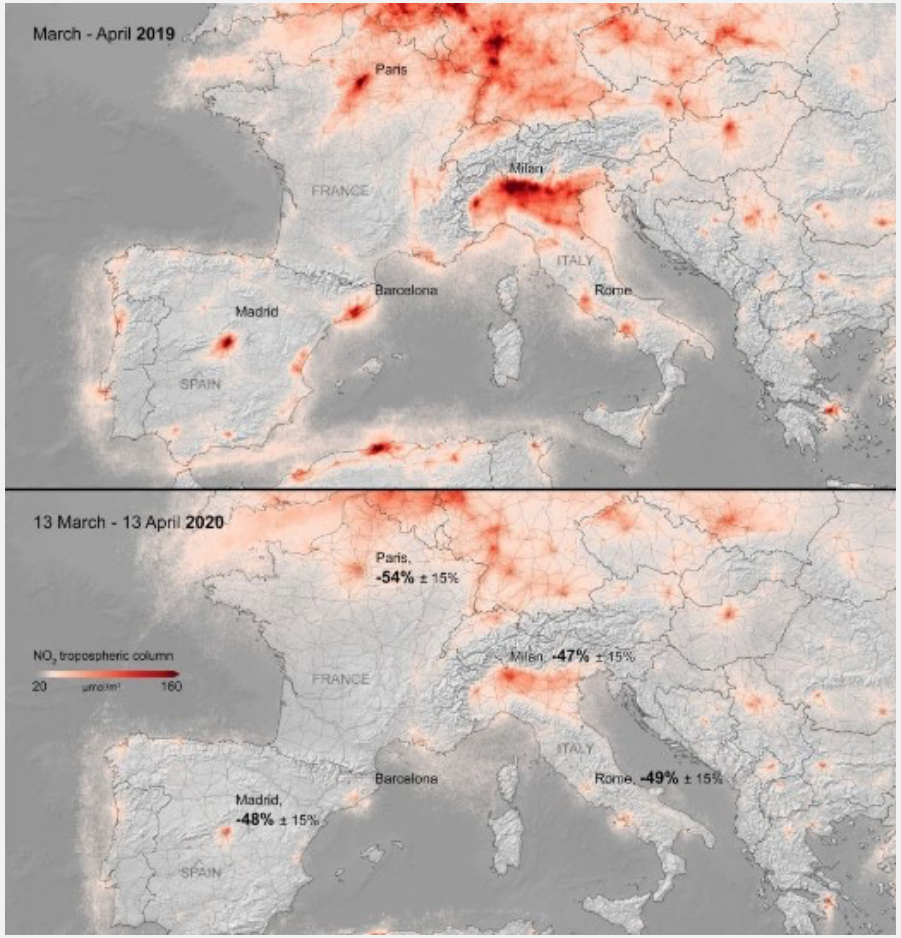
- Some new habits may have impacts on GHG production
  - Teleworking decrease need for commuting, require less space to conduct business and allow saving on rents and utilities
  - The rise of home delivery and e-Commerce will result in a larger fleet of vehicles delivering goods to the end-user and higher use of packages and waste

Structural changes are necessary to avert the “return to normality”

- Economic stimulus must not boost fossil fuel consumption
- Measures to avert a deep recession and measures for safeguarding the environment need to work together

Green Recovery is central in the transport sector

- It will safeguard environmental protection and mobility necessity
- It will be necessary to promote a shift in transport modes based on their environmental sustainability
  - Policy recommendation -> **Carbon Tax**



Source: European Data Portal

WORKING HYPOTHESES AND FORECASTS FOR RAILWAYS

Passenger transport

To reconcile health and mobility needs, passenger transport will have to **sustain** Member States policies for health and safety, such as:

- Social distancing measures
- Technology systems using Bluetooth perimeters and big data

Passenger transport might be interested by these **measures**:

- Health controls before the passengers boarding
- Mandatory body temperature controls
- Potential entrance restrictions
- New guidelines for cleaning and sanitization

WORKING HYPOTHESES AND FORECASTS FOR RAILWAYS

Passenger transport

Amongst the transport mode, rail transport will have **advantages**

- Adaptation of the wagon layout for sustainable passengers' seats will be fast and efficient.
- Rail will provide safe, independent compartments for a small number of passengers applying social distance measures.
- Rail will provide safe data detecting which passengers could have been exposed to the virus, respecting the privacy.
- Rail will be a cost-efficient transport mode in relation to the new requirements on health controls:
  - ✓ Security controls before accessing the station
  - ✓ Thermal cameras to measure body temperatures without slowing down travel experience
  - ✓ Easy to clean and sanitise wagons between journeys.

Urban mobility

COVID-19 impact on passengers

Fear of infection and interaction will boost private mobility (cars)

However, car manufacturers are experiencing difficulties and have been forced to shut down operations

Manufacturers and Member States are evaluating two alternatives:

1 – Postpone CO2 targets related to the production of hybrid and electric vehicles

2 – Promote state contribution to buy an electric vehicle

Effects

➡ Delay the effectiveness of environmental measures and lower the competitiveness of innovative solutions (EVs)

➡ Low effectiveness of the measures

➡ Division of population according to income

➡ Drain important resources which could provide safe, affordable and environmentally friendly mobility

Urban mobility

Risk of underuse of public transportation

Consequences	Where can Rail play a role?	Other unknown factors
Cities prioritising cars will possibly see mobility collapsing	Improved frequency and availability of trains can avoid dangerous shift of commuters to cars	It will be necessary to re-evaluate parameters such as frequencies, performance and train length
	Rail can provide fast, affordable, reliable services on an already existing, integrated and working network (MaaS)	
Under use of public transportation	Metro can provide deep interconnection with micromobility services	It will be necessary to limit the overestimation of COVID-19 and restore passengers' psychology vis a vis their general acceptance of risk to the pre-crisis level
		Role of green private mobility (electric bicycles and electric scooters) after adequate legislation
Less safe environment for road users, increased CO2 production, productivity and economic loss	Rail will provide a better service than conventional private mobility, limit traffic congestions and improving the inhabitants' quality of life	Degree of crystallization of modal shift towards car and cities' administrations farsightedness

Suburban mobility

Similarly to the urban mobility scenario, fear of infection and interaction will likely boost private mobility (cars)

However, green mobility is more unlikely to be achieved

- Low capillarity of charging station for EVs
- Higher price of EVs compared to traditional cars
- Lack of economic disincentives for higher polluter cars outside cities
- Electric micromobility will remain very marginal

➡ Public transportation, and **Rail in particular**, will play a major role in passengers' mobility.

Advantages

✓ Rail will be able to carry out safe health control operations

✓ Rail will allow easy and deep interconnection with micromobility services

✓ Rail will provide cleaner, safer and more punctual mobility services than private mobility

Challenges

- It will be necessary to re-evaluate parameters such as frequencies, performance and train length according to the new context
- Health control operations will need to be as minimal as possible, for railway transport to continue providing a seamless experience

Leisure and work-related long-distance travels

- The long-term effects of COVID-19 crisis on tourism and long-distance travels are still unclear.
- The best-case scenario is characterized by a severe reduction of long-distance travel for leisure and short-term tourism in each transport mode.
- International journeys are expected to not recover shortly. Long national journeys will also suffer severe setbacks.

The air sector will likely be the heaviest affected transport mode. The crisis will heavily influence the **air transport sector** for years to come, with unclear effects on airline companies and aircraft manufacturers alike.

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Leisure and work-related long-distance travels

Taking air transportation as a reference allow to identify railways strengths

Rail can make the difference with **night train service**

- ✓ Comply with social distance at low cost
- ✓ Lower prices than air
- ✓ Reduced GHG emission

Challenge	Air	Rail
Provide effective social distance and health controls measures	Extremely demanding and expensive	Feasible but with differences. Business travels could be more compatible with constraints and invasive health controls than leisure journeys
Provide deep cleaning and sanitization to the vehicle	Challenging	Feasible
Lower transport capacity	Economically hard to sustain: the aggressive yield management at the base of airlines business operation will likely be reduced, raising the price of airplanes tickets consistently.	Rail business model would allow an easier adaptation than the business model upon which airlines are working.
Effects on R&D and employment	Production of airplanes and the R&D of new models is likely to drop steadily. Boeing and Airbus will likely reduce employment and restructure their supply chains	Production and R&D are not expected to drop dramatically. Certain companies will likely reduce employment.

Higher controlling of individuum mobility patterns

In each scenario involving passengers, transport modes might have to work together with new technologies to contain the spread of the virus:

- Technology systems capable of calculating the risk for a specific individual to have been exposed to the virus
- Thermal cameras
- Computer vision technology to apply social distance
- Air filters and fans to ensure correct air circulation

While the unnecessary deployment of invasive system to over-protect passengers' health is a danger for the entire public transport sector, **rail has 3 advantages** over other public transport modes if such systems are implemented.

1 – Rail can accommodate technical equipment with limited constraint due to the size or energy consumption of the vehicle

2 – Rail can use more sophisticated stations than buses but in need of less human interaction for their proper functioning than airports. As such, they can carry out security measures with complete respect of the healthcare professionals' wellbeing and the passengers' privacy

3 – Rail can support advanced technologies for protection and control the spread of the virus. For example, train cabin can be equipped by automatic disinfection systems; personal protective equipment can become intelligent by integrating dedicated sensors and actuators

WORKING HYPOTHESES AND FORECASTS FOR RAILWAYS

Freight and logistics

Context

- COVID-19 is causing effects on the entire logistics chain of shipments with heavy disruptions of supply chains.
- The upcoming global recession will have consequences on advanced and emerging economies.
- Global value chains are expected to be restructured, following a trend of regionalization of supplies.
- WTO estimates that in 2020 world trade will decrease by up to 32%, thus producing profound effects on international logistics companies.

Rail freight reaction to COVID-19

- The sector have been resilient to the crisis: operators shifted capacity from seaports traffic to intra-European transport, rail has adapted to transport types of goods which have not typically been part of its core business.
- The EC provided Green Lanes at border-crossings to expedite the transportation of goods within a short timeframe.

The challenges ahead

- Rail freight will face challenges related to the slowdown in industrial output.
- Measures will have to prevent disappearance of operators and capacity through State support in the short-term.

WORKING HYPOTHESES AND FORECASTS FOR RAILWAYS | Freight and logistics

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Priorities for the recovery

- Boosting internal consumption
- Export support
- New investments -> infrastructure investments increase potential output, productivity and competitiveness

Key words for investments

- Transformation and technological modernization
- Innovation and sustainability needs
- Address the inadequacy of funding program
- International competitiveness
- Fast and functional regulatory framework to provide immediate start for projects

Policy recommendation

- The crisis is a call for action in enhancing the audacity of the TEN-T project. A modern, efficient and sustainable infrastructure system will improve European competitiveness and efficiency
- It is necessary to place rail at the centre of the reconstruction phase and provide adequate funding for innovation activities to develop a smart, efficient, innovative and reliable rail sector.

WAY FORWARD, THE 5 “R”

The future of Railways

- In the short term, the transport sector will have to cope with the COVID-19.
- However, simply adapting the European railway sector to this new challenge will be limiting and self- harmful.
- It will be necessary to reconsider the role of rail in Europeans’ lives, keeping the terms sustainability and competitiveness at the centre of tomorrow’s vision of Europe.

The European rail sector should follow these 5 steps:

- **Resilience**
- **Return**
- **Reimagination**
- **Reform**
- **Research**

WAY FORWARD, THE 5 “R” | Resilience

Resilience

In the immediate term

- The rail industry will need to address cash management challenges
- It will be necessary to develop new abilities as plasticity and learning to adapt as quick as possible
- Measures to make the European rail industry more robust against pandemics and similar threats need to be introduced
- The current period of reduced timetables should be exploited as a chance of focusing on maintenance and renewal of the current fleet

In the long term

- It will be necessary to develop resilient infrastructure with a high grade of automation in operations
- Introduction of electronic ticketing systems, addressing cash management challenges and information campaigns will provide strong financial resilience

WAY FORWARD, THE 5 “R” | Return & Reimagination

Return

To recover as soon as possible

- EU institutions need to create a detailed plan to return the business back to scale quickly
- It will be necessary to develop indicators or indexes to control the evolution of the instability recovery
- Short-term, medium term and long-term prevention, recovery and containment actions need to be determined

Reimagination

EU institution and industry need to re-imagine the “new normal”

- Provide funding for research and development activities: the rail industry needs to be at the centre of Europeans’ mobility, dwindling public funding would hinder rail development across the EU
- Align policies that promote economic growth and green transport policies
- Promote economic recovery while also pushing for changes in behaviour such as promotion of walking and cycling. In this context, public transportation and especially rail transport can play a fundamental role.

WAY FORWARD, THE 5 “R” | Reform

Reform

- The EC New Industrial Strategy for Europe and the Green Deal positions towards rail date back to before the COVID-19 crisis, and as such, it is not ready to cope with its consequences.
- It will be necessary to have the courage to not only to maintain the industry’s global competitiveness but provide a new political vision for Rail

WAY FORWARD, THE 5 “R” | Research

Research

The challenges faced by the European rail system during and after the pandemic need the support of a strong Europe-wide rail research program.

- Cooperation between universities and research centres needs to be reinforced, to provide innovative solutions in rail technologies and to improve the competitivity of European research
- European universities and research institutions need to be heard in rail-related EU decisions, to ensure the strategic vision is shared amongst the key actors in the European rail sector.
- Strong political direction must be shared by every actor in the rail sector, including universities and research centres. Large enterprises cannot steer or the vision of the future European rail sector alone.

Key areas in need of funds:

- Digitalisation and automation of vital processes dependent on manual operations
- Multi-dimensional analysis of urban mobility patterns and operational supply and demand side
- Research on reducing operational costs via new transport policies and legal actions
- Interdisciplinary research to provide guidelines for railway transport in time of health crisis
- Traceability of logistics through learning and predictive models capable of offering prognosis on sources of propagation in transport joined to the optimization of the resources of the railway community
- Interdisciplinary research on development and use of self-cleaning materials on trains

RAIL AS BACKBONE OF EUROPEAN SUSTAINABLE MOBILITY | Conclusions

Rail proved to be less prone to disruptions than other transportation and can provide an effective role in ensuring mobility and fighting the virus spread.

Opportunity from the crisis

The current situation can be an opportunity.

- ✓ It is necessary to take notice of the short-sightedness of sustaining carbon fossil fuels
- ✓ It is time for a concrete modal shift from road and air to rail, the most environmentally friendly mode of transport.
- ✓ Enhancing rail will guarantee immediate connectivity for European citizens and goods and a sustainable future for Europe