The economic significance of single-wagon load transport for the European industry

SCI/Verkehr

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This document contributes to strengthening the evidence base for the ongoing dialogue on the future of rail freight transport for the client. The results are presented.

Agenda

1 Single-wagon load (SWL) is of major economic and strategic importance for industry, employment and resilience in Europe.

2 SWL is complex and is currently operating at a loss. The current support measures are a first step but only stabilise the system in the short term.

3 Previous rationalisation measures led to a decline in volumes – due to poorer accessibility (A) or higher prices (B). This vicious circle must be broken: reduce costs through innovation (e.g. DAC), increase volumes through greater competitiveness.

→

The EU needs a strategy for the “Single-wagon load transport 2030” .

This requires coordinated European financing solutions to provide targeted support for SWL (particularly for shunting infrastructure, sidings and roll-out of digital automatic coupling – DAC).

1

Industry, employment and resilience in Europe

SWL is of major economic and strategic importance for industry, employment and resilience.

It is vital for Europe’s industrial base.

SWL democratises rail freight transport – it broadens access to rail freight services, while block trains are economically viable only for large sites

While a block train provides a direct point-to-point connection, **SWL integrates thousands of individual industrial sidings** into a complex network.

- Even locations that cannot fill a complete train with 20–30 wagons (e.g. SMEs, smaller manufacturers, timber loading points) gain **access to the climate-friendly and safe rail system**.
- This ensures regional supply and enables **direct delivery to customers.**
- These services are provided by **European state-owned railways** – supported by a few specialised private railways and regional service providers. As SWL requires a complex infrastructure (marshalling yards) and staffing, small railways are often unable to offer this network service.
- Unlike block train operations, SWL is a **highly complex network system** driven by three main cost factors:
  - high shunting and staffing costs,
  - the fixed-cost intensity of the infrastructure, and
  - the particularly time and cost-intensive ‘last mile’ delivery. Long turnaround times for wagons and locomotives typical of SWL reduce asset productivity and increase the capital costs per unit transported.

Comparison of process complexity between block trains and SWL

Block train

Loading at the sender’s premises

Direct route

Unloading at destination

Minimal staffing requirements: one locomotive driver, ad hoc service.

SWL

- Collection at the sidings
- Delivery to the hub
- Marshalling yard: train dismantling
- Technical wagon inspection
- Train formation (re-sorting)
- Mainline journey
- Marshalling yard: final distribution
- Delivery to the customer

High labour intensity: deployment of shunting personnel, wagon masters and shunting locomotives across the network.

SWL is the lifeline of basic industries and indispensable for cross-plant logistics – with sector market shares of over 60%, it is a system-critical factor

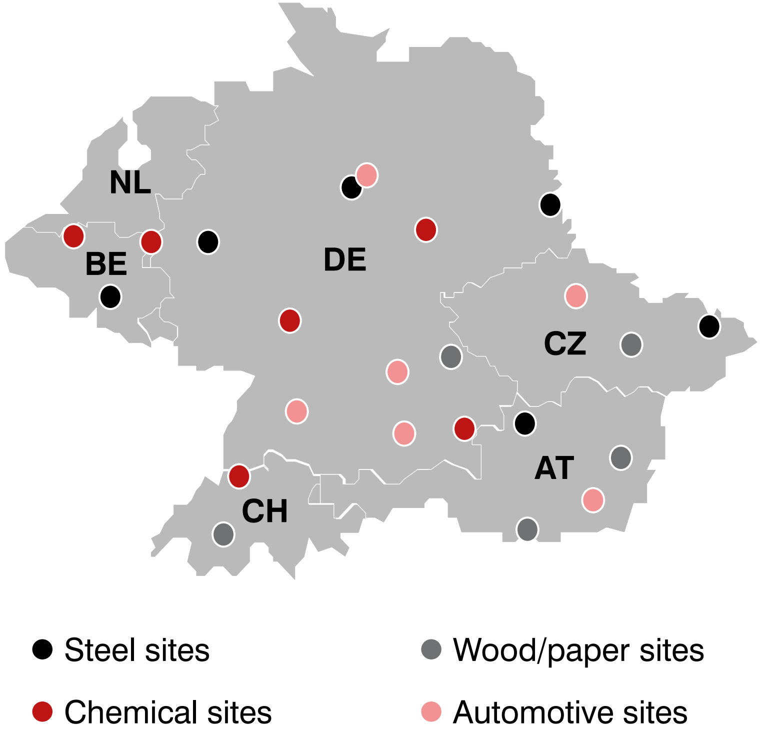
Steel: Granular distribution & circular economy

- SWL connects plants in the exchange of intermediate products (e.g. coils) and ensures the return of scrapping material.
- While steelworks produce in bulk, SMEs and the manufacturing sector require precise small quantities.
- SWL enables granular distribution to smaller customers.

Chemicals: Safety through risk concentration

- SWL consolidates the carriage of dangerous goods on dedicated infrastructure, thereby minimising the potential risk compared to road transport.
- This is critical, as many specialised plants and sites do not have track capacity for entire trains.
- The SWL thus ensures supply in accordance with the highest safety standards.

Selected SWL locations in Central Europe with a high density of sidings



Wood/Paper: Access to decentralised supply sources

- There are no block train terminals in the forestry sector. Without the SWL's decentralised loading points, rail would lose this market to road transport.
- Only SWL can collect small quantities from forest loading points and transport them efficiently to processing centres.

Automotive: Modular timing for production

- While finished vehicles roll along in block trains, SWL ensures the supply of components (e.g. engines).
- SWL enables the delivery of wagon groups without overloading the factory stations logistically.
- SWL plays a central role in just-in-sequence supply.

Source: Czech Railway Workers' Union, SEV Transport Workers' Union, SCI database
1: The percentage indicates the share of tonnage transported by SWL in the total rail freight volume of the respective national railway within the segment.

A reduction of the SWL network would create a major logistical bottleneck, requiring substantial investment in road-based alternatives and undermining global competitiveness of European industry

The 'Integrated Chain' vs. 'System Breakdown: road-based transport'
(using the chemical industry as an example)

- **Direct connection:** Tank wagons are positioned directly at the filling stations in the chemical park.
- **Buffer function**: Wagons serve as temporary storage (avoiding expensive fixed tanks).
- **Volume leverage**: A train moves up to 1,000 tonnes – with minimal staffing.
- **Safety advantage**: Closed systems, minimised risk of leakage during transfer.

- **Space consumption:** To transport the same volume as a single train, 30 to 45 lorries would have to arrive simultaneously.
- **Infrastructure congestion:** Chemical parks would have to massively expand their internal loading points.
- **Staffing crisis:** Instead of one shunting locomotive driver, 45 lorry drivers would be needed.
- **Physical limitations:** The local road infrastructure and motorway connections are not designed to cope with the additional volume of lorries (substitution volume) – there is a risk of a logistical collapse at the factory gates.

A significant reduction of SWL would not only lead to congested motorways, but also to a standstill in industrial production:

- **Steel & Chemicals**: The plants would be no longer logistically accessible. Where a train unloads 30-40 wagons today, a very large number of lorry movements would be required tomorrow. The result: a permanent logistics gridlock that stifles production because there would be no space for parking, manoeuvring areas and access roads.
- **Automotive**: The automotive industry would be burden with costs related to changing the logistics. Moreover, the emission costs would rise.
- **Timber**: Without SWL, the supply chain in the forest would collapse. Small country roads would suffer the impact of timber lorries, while the ecological transport of timber in the area would come to an end.

SWL operates as an international network system – a reduction in the network in Germany, for example, would have immediate effects on connected markets of neighbouring countries

Selected locations of large-scale industry and SMEs dependent on the international SWL

Chemicals – e.g. BASF, Borealis

Transport of speciality chemicals in tank wagons between main plants and decentralised processors.

Automotive – e.g. Škoda Auto

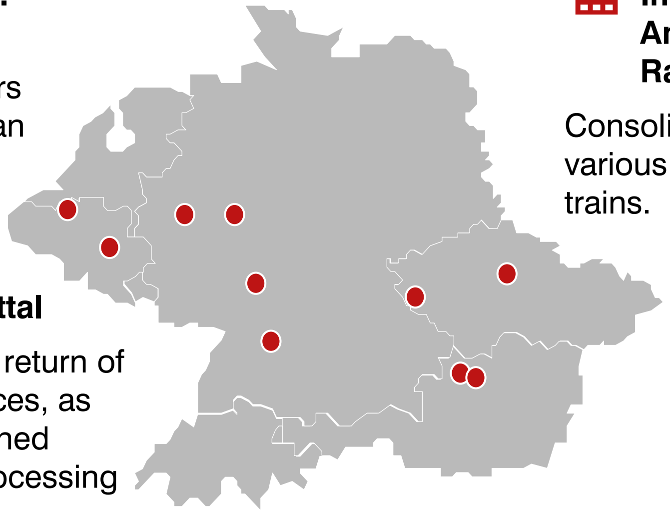
Just-in-time supply of engines/gearboxes from the European supplier network.

Consumer goods – e.g. Warsteiner

Supply to regional wholesalers for shipment sizes smaller than a block train.

Industrial clusters – e.g. Port of Antwerp, Stuttgart Industrial Railway

Consolidation of individual wagons from various SMEs into efficient long-distance trains.



Steel – e.g. ThyssenKrupp, voestalpine, ArcelorMittal

Shipping of coils to SME and return of scrap metal to secure resources, as well as transport of semi-finished products between various processing sites.

Wood – e.g. Lenzing AG, Papierholz Austria, Stora Enso

Connection of rural areas for timber transport and the supply of large sawmills.

Scrap – e.g. Scholz Logistik

- Return of secondary raw materials between industrial clusters (esp. DE/PL – IT via AT) to ensure closed material cycles.

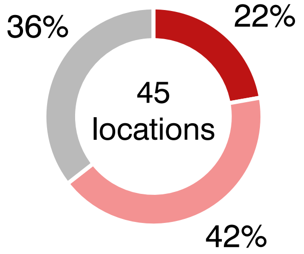
- **Xrail as a foundation**: Significant progress has been made in capacity booking and quality improvement through the Xrail alliance (including DB Cargo, RCG and SBB Cargo). However, this alone does not guarantee profitability.
- **European context & systemic risk**: The stability of SWL depends on a coordinated European approach, as national capacity adjustments directly affect cross-border transport and industrial supply chains.
- **Resilience through network integration**: In volatile market phases, reduced service frequencies lead to rising unit costs within the system: fixed costs are spread across lower volumes, which is immediately reflected in higher prices. The international SWL network makes it possible to maintain connectivity even when order volumes fluctuate.
- **Interdependence of large-scale industry:** SWL connects large-scale industrial production with small sites and specialist customers.

Short distances to rail access points strengthen defence capability and deterrence – the SWL network is the backbone of rapid crisis logistics

Example in Germany: The Bundeswehr has **just under 170 relevant Army units** and a total of over **380 locations** in Germany.

A scientific study of 45 key logistics areas revealed:

- that only **10 sites (22%)** still have their own active railway siding.
- A further **19 sites (42%)** are in the immediate vicinity (up to 3 km) of a loading point.



As part of the current network review at DB Cargo, there are discussions about permanently retaining at least 28 freight transport sites threatened with closure due to their importance for defence.

- As the retention of these sites primarily serves security policy interests, the cost burden must not be borne solely by the state-owned railway.
- It is inefficient to maintain these sites as ‘standby infrastructure’. The capacity provided and the necessary staff must also be used for civilian industrial customers in the region.

Massive underfunding:

The demand for defence-related and civilian rail logistics exceeds available EU funding by a factor of five[1] (EUR 3.7 billion required vs. EUR 800 million budget).

Decentralised direct integration:

Military loading takes place directly into the SWL freight flow from barracks ramps. This makes use of the dense rail network across the region and avoids time-consuming road transport or detours to distant block train terminals.

Resilience through network redundancy:

The finely meshed network of marshalling yards provides vital alternative routes. In the event of sabotage or damage to main lines, the SWL infrastructure’s flexibility allows bottlenecks to be bypassed.

Modular flexibility:

For large-scale relocations, the availability of specific wagon types and pre-configured wagon groups (e.g. 8–12 wagons) is crucial, which is made possible by the SWL’s system.

1: ‘The connection of Bundeswehr bases to the rail network’, ZEVrail Glasers Annalen, author(s) including T. Strecker;
Sources: Federal Ministry of Defence, “Bundeswehr erleben” portal; Special Report 04/2025 of the European Court of Auditors (ECA)

The SWL network offers advantages over block trains or purely road-based transport chains, particularly for short-notice and decentralised transport

Comparison: Role of SWL and advantages over block train

Defence requirements	Usual System	Role of SWL
Mass deployment (heavy vehicles/large formations)	**Block train & SWL**	**Network guarantor :** Provides necessary alternative routes and marshalling yards. Moreover, availability of different types of wagons is also required; SWL provides these wagon pools and enables them to be put in the right place at short notice.
Supply to small locations (depots/barracks)	**SWL**	**Direct connection:** Enables rail logistics away from the major hubs.
Short-notice spare parts & supply logistics	**SWL**	**Flexibility lever:** Rapid integration of individual wagons into daily schedules.
Infrastructure readiness (ramps/connections)	**SWL**	**System maintenance:** Daily use ensures the operational readiness of the facilities.
Mixed types of goods (mixed trains)	**SWL**	**Modularity:** Combines pre-configured groups of wagons (e.g. 8–12 wagons) into a train.

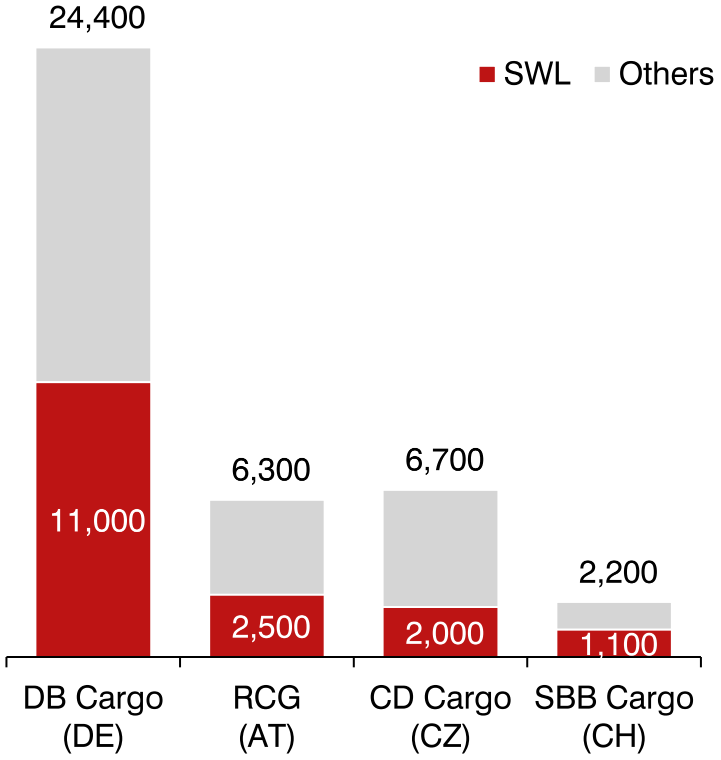
- Logistics for defence capability encompasses both deployments, exercises and the continuous supply of many sites.
- Whilst heavy formations are often deployed in block trains, ongoing supply requires flexible and decentralised transport structures.
- The SWL secures the infrastructure, personnel and shunting locomotives across the region. In the event of a crisis, defence logistics relies on existing civilian capacities for SWL (without this implying a general availability of personnel).
- If SWL capacity is lost, the personnel and technical basis for defence-related transport operations is also weakened.

!

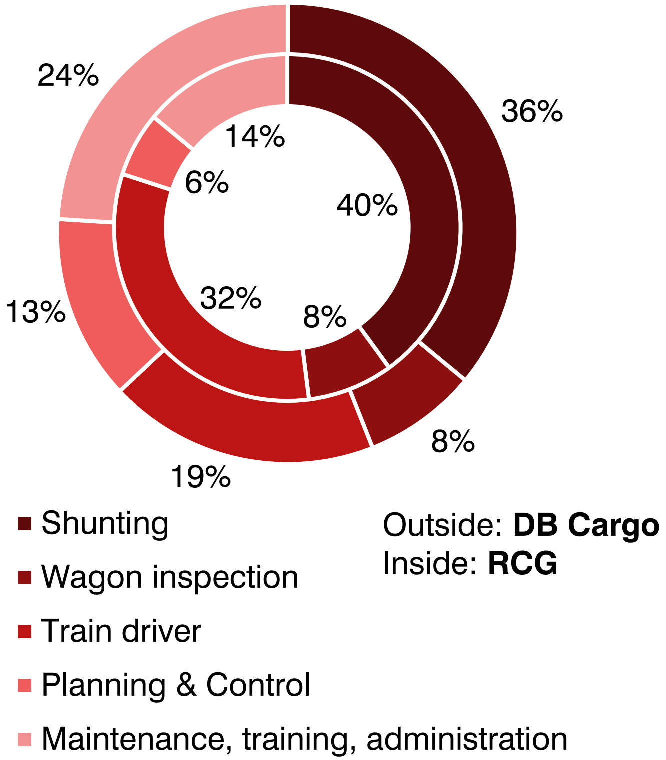
The railway plays a central role in defence capability – Ukraine, too, relies on rail transport for its defence.

The SWL not only safeguards Europe's safety – it also preserves expertise that is essential for industrial performance

Employees: Total workforce and SWL share (number of employees; 2024)



DB Cargo and RCG[1] SWL workforce[1] by occupational group (% of employees)



- **Labour-intensive system :** SWL requires highly specialised skilled workers (shunting locomotive drivers, wagon masters, dispatchers) who manage the complex train formation and technical inspections.
- **Strategic reserve of expertise:** The ability to reorganise heterogeneous wagon flows under time pressure is a core competence relevant to safety. If this personnel is lost due to network reductions, the system cannot be restarted at short notice in the event of a crisis.
- **Infrastructure & operational assets:** The maintenance of tracks and ramps alone does not ensure mobility. Only the daily civilian use by SWL guarantees that locomotives, technology and marshalling yards remain ready for operation.
- **Complexity management:** Railway logistics is a high value-added competence. SWL supports the development of the level of precision and safety that is crucial for the transport of dangerous goods or defence-related cargo.

Source: Railway and Transport Union, vida Trade Union, Czech Railway Workers' Union, SEV Transport Workers' Union

1: Due to integrated production within the RCG, the reported figures are partly based on estimates and the allocation of service shares to single-carriage transport; figures of SWL at RCG refer to their business in Austria.

2

Economic challenges and support measures

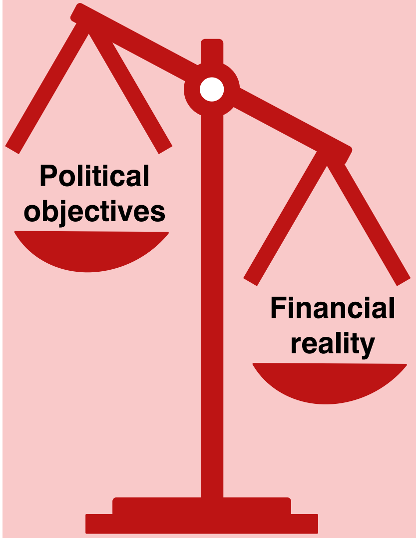
The SWL is complex and is currently operating at a financial loss. The current support measures are a first step, but they only stabilise the system in the short term.

SWL is the structurally weakest segment of state-owned railways – policymakers are calling for shift to rail, whilst competition is forcing rail operators into cost-cutting measures that threaten their existence

SWL: a structurally loss-making segment for RUs*

Railway	EBIT 2024 (EUR m)	Status of SWL
DB Cargo	-350	SWL accounts for approx. 80% of losses but secures 90% of the network.
RCG	-10	SWL contributes to the strained earnings situation; relative low losses.
SBB Cargo	-100	Despite high efficiency: 'last mile' costs are eating into margins.
PKP Cargo	-550	The general cargo sector – primarily coal transport – is responsible for the deficit.
CD Cargo	-40	The decline in coal and steel is leading to a persistent loss-making situation.
Green Cargo	-30	Continuous losses in SWL despite government support.

Source: Annual reports



- **"The paradox of state railways":** Politicians expect rail operators to serve the whole country (public service) and want to shift traffic from road to rail, yet they assess the companies based on business performance indicators.
- Restrictive EU competition rulings against state railways such as Fret SNCF and DB Cargo have intensified the economic pressure on SWL and, through regulatory intervention, are jeopardising the system-critical stability of the network.
- Current national subsidies have alleviated the problem but have not solved it entirely.
  - **High fixed costs**: Rising infrastructure costs and increasing regulatory requirements are raising the fixed cost base of SWL. Marshalling yards and staff across the network must be on standby, regardless of whether 10 or 100 wagons arrive.
  - **Cross-subsidisation** is **breaking down**: previously, profitable block trains (e.g. coal) supported the SWL. Decline in traditional volumes in the wake of structural changes in the industry adds financial pressure to railway companies.

Subsidies are a first step towards safeguarding rail freight – despite its public-value contribution, SWL-specific support is still selective and subject to inconsistent regulatory frameworks

Operational funding for rail freight transport in a European comparison (as of 2025) –
Intensity and planning horizon of SWL and overall rail freight subsidy

		Max. amount p.a. (EUR million)	Performance p.a. (billion tkm)	Ratio (Eurocent/tkm)	Period
Funding for SWL transport	Germany	320	19.2	1.7	2025–2029 (5 y.)
	France	100	7.1	1.4	2026–2030 (5 y.)
	Switzerland	70	1.4	5.0	2026–2029 (4 y.)
	Hungary (expired)	17	1.1	1.5	2021–2025 (5 y.)
Funding for the entire rail freight	Sweden	289	21.0	1.4	2021–2025 (5 y.)
	Austria	77	21.8	0.4	2023–2027 (5 y.)
	Spain	40	9.3	0.4	2023–2026 (4 y.)
	Portugal	9	2.2	0.4	2025–2029 (5 y.)
	Denmark	4	1.8	0.2	2021–2025 (5 y.)

The current data indicates a fragmented funding landscape in the European rail sector:

- Funding scope, subsidy levels and programme durations differ significantly between countries.
- Even approved programmes do not always provide full planning certainty. In Germany, for example, the subsidy has been approved until 2029; however, the actual annual funding envelope remains subject to federal budget decisions. Market participants view this as a risk.
- Several countries do not provide SWL-specific support. While general rail freight subsidy schemes exist in these markets, they do not address the specific cost intensity of single wagonload transport. As a result, the system that fulfils a central capillary function[1] for industry, regions and defence-relevant transports remains subject to uneven regulatory support.

Source: European Commission, State Aid Register (among others SA. 108800, 117920, 59448, 104264, 117606, 100486), national transport ministries, COM State Aid Case 2024, own calculations (funding amounts p.a., 2024).
1: The 'capillary function' of the SWL describes the ability to bundle individual carriages or small groups of carriages from decentralised sidings and feed them into interregional services via marshalling yards.

The incomplete internalisation of external costs in road freight transport distorts competition to the detriment of climate-friendly SWL transport

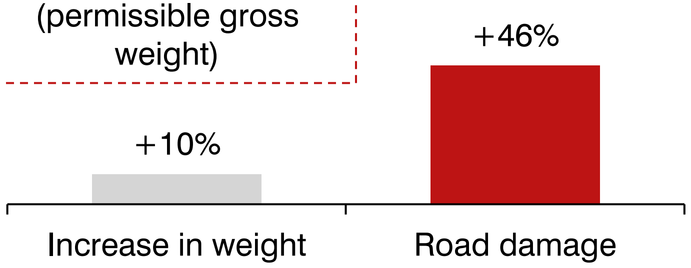
External costs of road freight transport in Germany

Massive economic costs of congestion

€3.6 billion
per year

Heavier lorries damage the roads

EU plan: 40 t → 44 t (permissible gross weight)



Environmental damage & failure of climate targets

+70%

CO_2 emissions from road freight transport have risen sharply since 1990.

The transport sector is significantly failing to meet its climate targets, largely due to the persistently high emissions from road freight transport.

Incorrectly parked lorries increase safety risks

Excessive pressure on road infrastructure: around **40,000** lorry parking spaces are missing.

Around **50%** of these incorrectly parked lorries are in high-risk areas.

- The highlighted burdens caused by congestion costs, infrastructure damage and safety risks are indicative of structural shortcomings in European transport policy. Whilst SWL must fight for every million in funding despite its high social returns, road transport is effectively heavily subsidised by the failure to internalise its external costs.
- This leads to chronic congestion on road networks and undermines the European Green Deal targets. Particularly critical is the planned increase in permissible gross weights for lorries, which suggests higher road efficiency but causes disproportionate damage.
- Unfavourable working and social conditions in road freight transport generate additional social costs that distort competition with rail freight transport and SWL.
- A fair competitive framework requires the consistent internalisation of these costs or compensatory, more substantial financial support for rail freight transport and SWL.

Sources: INRIX Global Traffic Scorecard 2024, European Commission, OECD, Federal Environment Agency, industry associations (BGL), ADAC service station tests

3

The future of SWL in three scenarios

The future role of the SWL can be illustrated in three scenarios: (1) significant cost reduction, (2) focus on increasing revenue, and (3) political and technological changes

SWL is under pressure from the European Commission – DB Cargo and SNCF, among others, are being forced to undergo radical restructuring, but conventional measures alone threaten the system

The background

The European Commission (EC) is demanding a fundamental restructuring of the rail sector, as years of deficits are being classified as unlawful state aid.

- **Fret SNCF** had to undergo radical restructuring due to EC requirements (‘discontinuity’). The result was the discontinuation of numerous services and the break-up of the company.
- **DB Cargo** is under massive pressure to eliminate losses in SWL. The EC is calling for a clear separation of profitable block trains and the loss-making SWL network.

A comparison of strategic levers

Strategic lever	Operational implementation	Resulting scenario
Cost reduction	**Network reduction:** Closure of loss-making sites and sidings (analogy with the Post Office: ‘Serving only major cities’).	**Scenario A:** Controlled withdrawal / skeleton network
Increase revenue	**Price adjustment:** Massive increase to achieve cost recovery without regard to market elasticity.	**Scenario B:** Aggressive pricing
Innovation & transformation	**Efficiency & promotion** Cost reduction through technology (e.g. DAC) whilst supporting revenue to expand the market.	**Scenario C:** Technological transformation

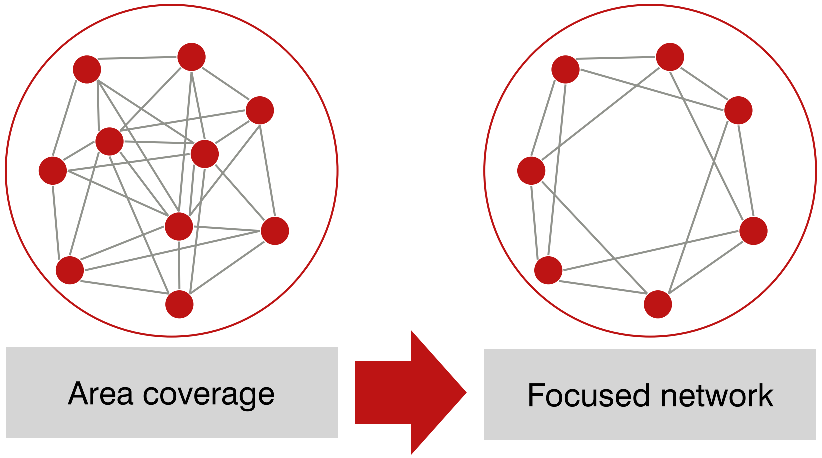
In the past, levers A and B were mostly applied, which, however, led to a downward spiral: Reduced network (A) or higher prices (B) lead to volume losses. Scenario C breaks this vicious circle by reducing the cost structure through automation, rather than simply reducing the network.

Network reduction is a slow death: whilst discontinuation of expensive services improves the balance sheet in the short term, the system becomes increasingly expensive per remaining wagon

Scenario A: Network reduction

Hypothesis

- **Status quo:** In Germany, there are still around 2,100 actively served sidings, of which around 400 could be lost during the transformation process. In Austria, there are still around 900.
- Radical cost optimisation would render connections in rural areas (particularly in southern Germany, Saxony and rural regions of the Czech Republic) unviable.



Consequences

Short-term margin optimisation:

- Reducing loss-making ‘last mile’ rail services improves the bottom line only in the short term.
- Significantly lower demand for shunting locomotives and specialist staff.

Focus on the core network:

- Potentially higher punctuality and reliability on the remaining main corridors by relieving pressure on hubs.

The creeping erosion of the system:

- The remaining fixed costs of major hubs must be spread across fewer wagons – thereby increasing the cost per unit.
- The closure of small sites initially leads only to minor losses in revenue but gradually destroys the necessary network effects for the overall system.
- Similar mistakes have already been made in passenger transport. Once decommissioned or structurally dismantled, reactivation is virtually impossible both legally (planning approval) and financially (investment requirements).
- Industry loses planning certainty and halts investment in sidings, which cements the shift to road transport.
- The comprehensive service network disappears, rendering rail transport obsolete for small and medium-sized sites.

A reduction of the network would have serious consequences for the attractiveness of European industrial sites and their logistical options

Scenario A: Network reduction

Industry and sites

- **Steel:** The abandonment of decentralised connections makes the exchange of intermediate products between plants virtually impossible. As this networked production is entirely dependent on the SWL system, network reductions lead directly to site closures and the collapse of European value chains.
- **Chemical companies**: The loss of decentralised connections cuts off the vital plant transport for intermediate products. As specialised chemical production relies on this continuous exchange within the SWL system, a switch to hazardous goods lorries must be made, posing a significant safety risk.
- **Construction materials** / **minerals**: The loss of decentralised connections forces the sectors onto the roads, which is more expensive due to long loading and unloading times and staff shortages. Without the efficient SWL, construction costs for infrastructure and housing will rise.

Consequences for industrial production and defence

- By concentrating on core routes, many industrial regions lose access to the rail network. As rail freight transport is a closely interconnected system, these regional withdrawals trigger a chain reaction: cross-border transport chains collapse, weakening the industrial base of neighbouring countries.
- The abandonment of decentralised connections and the withdrawal of SWL from the regions makes production based on the distribution of labour between plants impossible, leading to site closures.
- Whilst road transport is indirectly subsidised by unpriced social costs (environmental and accident costs) as well as poor working and social conditions, rail loses its economic basis.
- Furthermore, the loss of decentralised loading bays jeopardises defence capabilities and the necessary redundancy in the event of a crisis.

Scenario A is a dead end:

- Railway undertakings restructuring through network reduction buys short-term results at the cost of diluting the European industrial network.
- Withdrawal from specific regions, e.g. in Saxony, southern Germany and the Czechia, creates ‘white spots’ that disrupt cross-border value chains and make production based on the distribution of labour between plants impossible.
- The distribution of labour between specialised plants in the steel and chemical industries becomes physically impossible, as this is necessarily based on the SWL system. The loss of decentralised connections leads to cost increases due to the shift to road transport.
- This scenario sacrifices long-term public services and Europe as a competitive industrial base for the sake of short-term liquidity improvements.

Price rises would hit the industry hardest where the situation is already precarious – price pressure forces weaker industrial sites to withdraw from rail transport

Scenario B: Price increase

Hypothesis

- Railway undertakings aim to achieve full cost recovery through a massive increase in transport prices (>50%).
- The aim would be to achieve the 'break-even' point in SWL purely through market prices and to focus the portfolio on high-margin specialised transport.

The price elasticity effect

Consequences

Tipping point for profitability:

- Price increases for price-sensitive goods lead to an immediate exodus of shippers.
- As logistics margins in these segments are often very low, these customers switch rapidly to road transport.
- This results in a fall in total revenue despite higher prices, as volume declines faster than prices rise.

Fixed-cost trap and underutilisation:

- The massive loss of customers reduces the utilisation of the entire infrastructure, vehicles and staff.
- As fixed costs remain virtually constant, they must now be spread across a smaller number of remaining wagons, which undermines profitability.

Erosion of the customer base:

- A portfolio rationalisation would take place. While anchor customers (dangerous goods, armed forces) are largely price-insensitive due to a lack of road permits, customers with limited alternatives (chemicals) respond by adopting logistical workarounds, such as relocating production abroad or block train concepts with truck pre-carriage.

Market-driven network rationalisation:

- In contrast to outright cuts, the network is being scaled back indirectly via pricing.
- Higher costs act as a selection filter: whilst financially strong corporations can bear the surcharges, the less robust part of the industry is excluded from rail logistics. This deprives already burdened industrial sites of important, competitive transport alternatives.

Increasing transport costs would exacerbate the crisis in key industries, increase logistics costs and undermine industrial locations

Scenario B: Price increase

Industry and locations

- As many industrial goods are traded on global markets, rising logistics costs in SWL can only be passed on to a limited extent; this leads to a structural cost disadvantage for European industrial sites and places a lasting strain on their competitiveness.
- Cross-border value chains are particularly affected, as even moderate cost increases have a direct impact on site investments and supply-chain decisions.
- Cross-border SWL routes of high industrial relevance include DE–CZ (automotive/steel), DE–AT (interconnected network), and DE-BE-NL; DE–IT (corridor for steel and chemical transport).
- As a result, there would be a greater shift in supply-chains towards global markets, meaning that intermediate products are increasingly imported via seaports rather than sourced within Europe by rail.

Consequences for production and defence

- Nationally, price increases would lead to a concentration on a few profitable main corridors, whilst industrial regions lose competitiveness due to the rising costs of the 'last mile'. At the same time, along international supply chains, the price increases of several state-owned railways would add up to a significant overall burden, which encourages a withdrawal from European, rail-based logistics chains.
- The military would in principle be able to bear higher transport costs but remains dependent on civilian co-financing and network utilisation; rising prices in rail transport therefore do not lead to savings for the public sector, but shift the financial burden towards the defence budget, as reduced transport policy subsidies would have to be offset by correspondingly higher costs for military transport.

Scenario B leads to a creeping erosion rather than an abrupt withdrawal in the SWL network:

- Rising prices in SWL do not have a localised impact but affect the entire value chain and have cumulative effects across national borders.
- In globally competitive markets, this results in structural cost disadvantages for European production sites that cannot be offset either by efficiency gains or by price adjustments.
- The result is a gradual reorganisation of logistics and supply-chain strategies – towards road-based transport and global import chains – causing the European production to lose ground.
- This scenario does not immediately reduce the system's performance, but in the long term it undermines its economic viability and shifts some of the resulting costs to other national budgets.

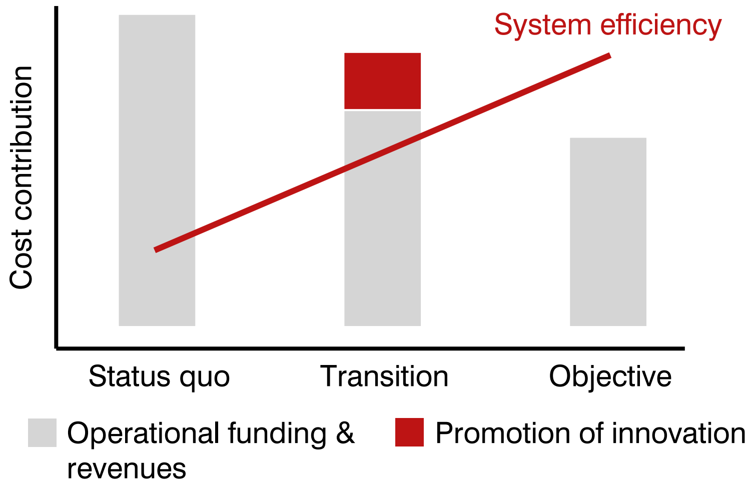
Technology-driven efficiency gains are the only sustainable path forward, as it solves the structural problem of SWL – automation and targeted support are necessary

Scenario C: Efficiency through technology

Hypothesis

- Targeted efficiency improvements in SWL – particularly through the use of new technologies, e.g. the Digital Automatic Coupling (DAC), as well as performance-based funding – would sustainably improve the system's cost and performance structure.

Temporary innovation funding as a bridge for the transition towards increased efficiency



Consequences

Automation as a cost lever:

- DAC could turn the SWL into a 'smart train'. Automatic brake tests and digital checks speed up handling at the hubs. This boosts process efficiency and enables structural cost reductions in operations.

Quality and capacity:

- By reducing operational costs, the competitiveness of SWL improves compared to road and block train solutions; this increases its appeal, particularly for price-sensitive freight.
- Existing customers can shift additional volumes to rail, whilst at the same time enabling the recovery of former customers and the development of new transport routes.

Overcoming financial hurdles:

- Although a high initial investment (totalling EUR 6-10 billion across Europe) is required for the retrofit, these funds act as a lever for sustainable profitability.
- This funding would be used as financing for technological change, rather than merely managing deficits.

Securing the industrial capillary function:

- Technology can close the economic gap. This would secure the industrial base across Europe and provide customers with the necessary planning certainty to rely on rail rather than road in the long term.

Lower costs would lead to higher transport volumes, as an efficient and future-ready SWL would increase its competitiveness and would become more attractive compared to road transport

Scenario C: Efficiency through technology

Industry and locations:

- Improved cost and performance structure of SWL would increase the attractiveness of industrial sites, as companies can once again rely on competitive and reliable rail-based logistics solutions.
- The availability of flexible logistics options is a key location factor for industrial production and influences both the retention of existing plants and investment decisions in favour of European plants.
- For material-flow intensive industries in particular, as well as decentralised production and recycling plants, SWL creates the conditions for maintaining and further developing production and supply-chain in an economically viable manner.

Implications for production and defence

- SWL supports the achievement of national and European climate targets through increased modal shift to rail and helps to reduce existing shortfalls in climate policy within the transport sector.
- At the same time, it promotes the physical integration of the European single market.
- The capillary network is a strategic reserve and increases the overall resilience of European logistics.
- The use of modern technologies and a higher degree of automation would enable faster and less personnel-dependent mobilisation of troops and equipment in the event of a crisis.

Scenario C enables structural stabilisation of the system rather than short-term optimization:

- Unlike purely cost or network-side adjustments, this scenario addresses the underlying efficiency deficits of SWL and creates the conditions for sustainable economic viability.
- The combination of technological development and targeted transitional support builds a bridge that guides the system step by step (and without destabilisation) towards greater self-sufficiency.
- The technologies form the basis for further (partial) automation and enable continuous improvement of the cost and performance structure.
- However, this scenario requires consistent, long-term political support with adequate financial backing to secure the transition phase until economic viability is achieved.

The EU needs a strategy for the “Single-wagon load transport 2030” – SWL is decisive for the European industry and safety

A European Vision

- Industry & territory: a harmonised European network that secures the industrial base and its comprehensive infrastructure
- Defence: maintaining logistical depth as a strategic reserve for defence, as well as safeguarding the necessary operational and technical expertise within the system

Investment: co-financing the transformation

- Financial hurdles: The necessary investments far exceed the rail operators’ capacity to invest.
- Call: Development of a coordinated European financing solution to support the modernisation of SWL (infrastructure and rolling stock) across national borders.

Transition: continuity of operational support

- Transition phase: Until the new, more efficient infrastructure is fully operational, the existing system cannot collapse; a stable and predictable framework is crucial for this.
- Stability: Maintaining and securing operating subsidies at least at current levels would prevent the industry from exiting the market during the transition phase. Harmonising regulations, durations and subsidy rates would ensure planning certainty and cross-border consistency.

The solution: investment in technology

- Modernisation: A sustainable SWL is only possible through a technological jump.
- Core components: Rapid roll-out of DAC, procurement of modern shunting assets and the automation of train formation facilities.

It’s not about transport – it’s about Europe’s industrial future.

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