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Bold moves to boost European rail freight

Europe's big aspiration to reverse the decline of its rail freight industry will require significant effort, with substantial investment and smart thinking. Governments and industry players can help to achieve this goal, as there are examples of success to draw on and some key levers to pull.

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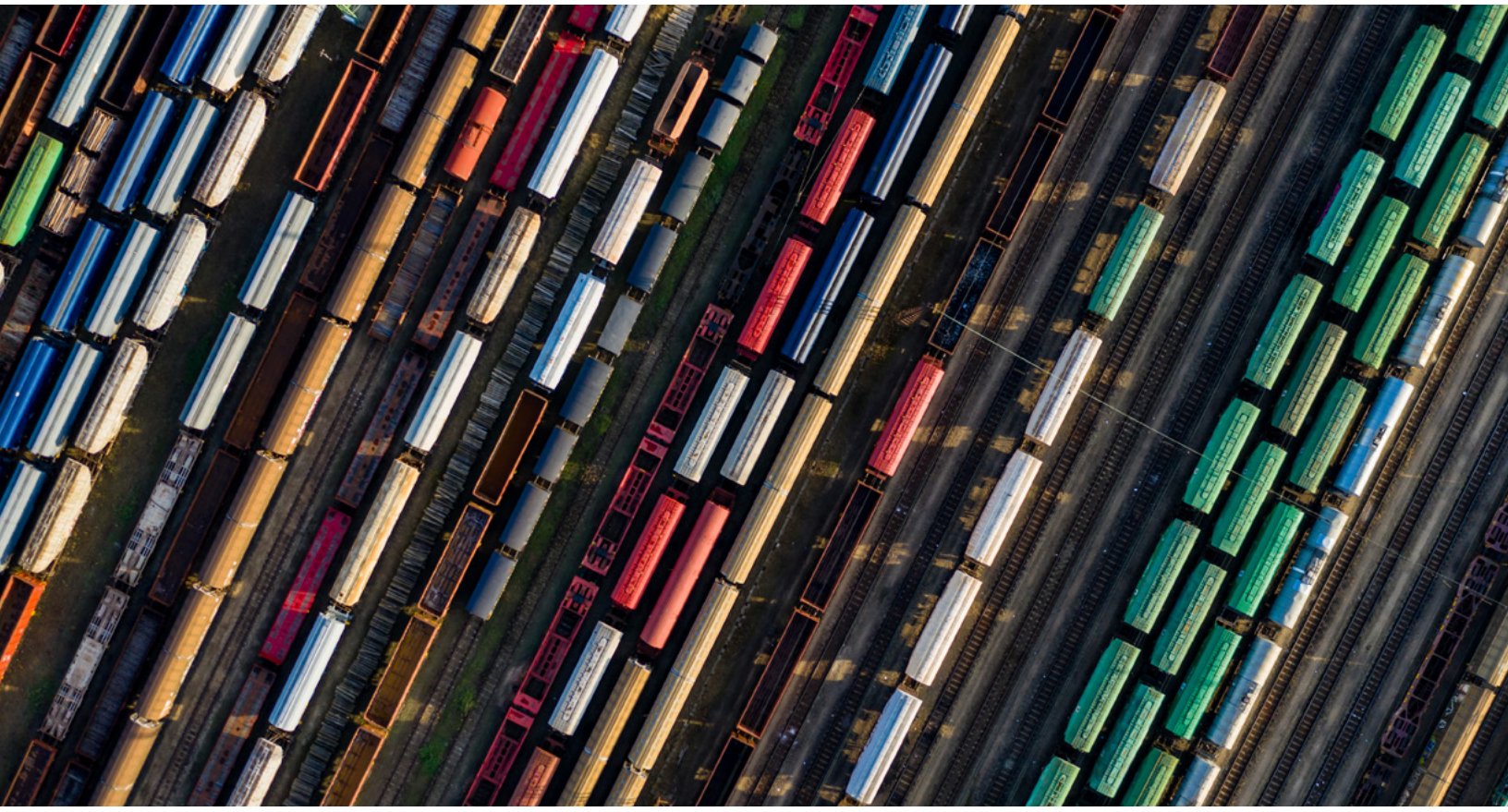

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The European freight rail industry has seen a steady decline over the past 70 years. Freight rail's modal share has decreased from around 60 percent in the 1950s, and 30 percent in the 1980s, to roughly 15 percent today, driven mainly by large industry shifts.[1] This prompted a vicious circle of increasing fixed costs, leading to loss of competitiveness and loss of volume, and consequently increasing fixed costs again—with little hope for a thriving future. The rise of new small and agile entrants worsened the situation for freight rail incumbents that were left with unhealthy structures and often faced political pressure to maintain unprofitable businesses.

The European Union has set a bold ambition to reverse this trend. It plans to double freight rail's modal share by 2030, both to reduce the transport sector's CO2 emissions and to ease the congestion of major road connections.[2] Achieving this ambition would see freight rail volumes grow by around six percent a year in ton-kilometers (tkm).

A massive shift in trajectory would be required to achieve this ambition. A European strategy to transfer a large proportion of transport from road to rail could focus on several key elements, including major long-distance freight flows, key connection points such as ports, and new industries that can replace volumes lost in declining sectors. Regulators and operators could also play a role in rethinking the regulatory model and reorienting the industry to become more customer focused, and more profitable.

Doubling freight rail's modal share requires major transformation

As far back as 2011, the European Commission set a target of shifting as much as 30 percent of road freight that is transported further than 300km to other modes of transport, such as rail or waterborne transport by 2030—and to increase this to more than 50 percent by 2050.[3] Such targets have been confirmed recently on the European level[4] and also by member states, such as France and Spain.[5]

These objectives are in line with the motivation to build a greener and more digital transportation system that will be more resilient to future crises, particularly in the context of the Paris Agreement on climate and the stimulus plan launched to deal with the economic crisis associated with the COVID-19 pandemic. However, the effort required to double freight rail's modal share throughout the EU will be substantial. Goods transported by rail would increase from 420 billion tkm today to approximately 1,000 billion tkm in 2030—a yearly growth of 6.1 percent.[6]

What this means in practice is that France and Germany, for example, would need to shift 90 percent of goods that are transported more than 500km—and 50 percent of goods transported more than 300km—to rail to boost today's modal share from 19 percent and 10 percent respectively to the target of 30 percent. Similarly, for Spain to boost modal share from 5 percent today to 30 percent, it would need to shift 55 percent of transports beyond 500km, or 40 percent of transports beyond 300km to rail.

In an alternative perspective, reaching 30 percent modal share would mean shifting 70 percent of food and agricultural products from road to rail in Spain. Meanwhile in Germany, the 30 percent goal could be reached by shifting 60 percent of all metal and ore volumes to rail.

Given today's preference for truck transport, the freight rail industry will need to undergo a major performance shift if it is to provide a competitive alternative. Today, truck transport is better positioned than rail in terms of cost, flexibility, and reach.[7] Furthermore, truck transport is expected to gain a cost advantage of between 20 and 30 percent by 2050, given advances in driverless

[1] Jose Vassallo and Mark Fagan, *Nature or nurture: Why do railroads carry greater freight share in the United States than in Europe?*, Taubman Center research working paper series, number WP05-15, December 20, 2005; European Commission, Eurostat Freight transport statistics – modal split; Deutsches Institut für Wirtschaftsforschung (DIW), *Verkehr in Zahlen*, Hamburg: Bundesministerium für Verkehr (Federal Ministry of Transport), 2000 and 2020.
[2] 30 by 2030: *Rail freight strategy to boost modal shift*, Rail Freight Forward; European Commission, Mobility Strategy.
[3] *Rail freight transport in the EU: Still not on the right track*, European Court of Auditors, 2016.
[4] 30 by 2030: *Rail freight strategy to boost modal shift*, Rail Freight Forward; European Commission, Mobility Strategy.
[5] David Burroughs, "Spain outlines €1.5bn investment to improve intermodal freight," International Railway Journal, June 3, 2021; French Rail Freight of the Future (4F) website.
[6] Eurostat, Goods transported dataset, 2003-2020.
[7] *Freight on Road: Why Shippers prefer truck to train*, Directorate General for Internal Policies, European Parliament, 2015.

operations, flow optimization by advanced analytics, and fuel efficiency. The rail industry would need to at least match these cost savings, if not exceed them significantly, to gain market share.

The situation is intensified by the fact that traditional customer industries for freight rail—such as coal, iron ore, and petrol—are declining. In fact, they are expected to decrease by 1 percent a year until 2030.[9] To make up for lost volumes, rail will need to grow seven times faster than road transport to reach the expected modal share of 30 percent.

Freight rail in Western Europe has seen a steady decline

Freight rail's modal share has been in decline across Europe, both in terms of market share and the profitability of major operators. In France for instance, modal share declined by 50 percent, from around 30 percent in the 1980s to 15 percent today. By contrast, road transport has been steadily increasing. In 1980, less than 50 percent of goods were transported by road. This rose to more than 75 percent by 2018.[10]

The decline in freight rail can be attributed to three factors: a loss or decline of key customer industries, the withdrawal of railways from providing various unprofitable services, and road transport improving its relative cost position compared to rail services.

First, traditional heavy-industry clients disappeared, particularly coal and steel. For instance, European coal production decreased by 60 percent between 1990 and 2019.[11] In the United Kingdom, the phasing out of coal in the power industry caused a drop of 85 percent of the tkm performance of coal transport by rail.[12] And in Germany, the volume of coal, iron, and metal transported dropped by around 85 million tons between 1970 and 2017—representing a 60 percent drop in the volume of freight rail from all sectors in the country.[13]

Second, railways discontinued or reduced certain services—such as single wagonload, break bulk transport, and expedited overnight services—as these showed low or negative margins and faced heavy competition from road transport. Countries like Spain, the United Kingdom, and Denmark, for instance, no longer see any single wagonload traffic, which used to comprise 20 to 40 percent of all rail transport. In parallel, associated infrastructure was heavily reduced. For example, in Germany over the last 25 years the number of private rail sidings dropped from around 11,500 to around 2,300.[14] Similarly, in France the number of private access points dropped from roughly 11,200 in 1970 to 1,150 in 2019.[15]

Third, road transport saw a significant improvement in productivity with the arrival of more fuel-efficient trucks. Companies were also able to engage workers at lower wage levels, for instance by hiring drivers from Eastern Europe. Additionally, new transport demands such as the need for greater flexibility to accommodate just-in-time production, smaller lot sizes, and decentralized flows gave road freight a natural advantage.

The loss of rail volumes and a decline in competitiveness, in combination with a market opening up to private road players, initiated a vicious cycle: declining volume—at high fixed cost—led to the cutting of non-profitable services resulting in a high fixed-cost structure not sufficiently covered by revenue growth. In a low margin industry, this situation involves structural losses that are hard to recover, especially in an economic crisis.

Exceptions and successes exist

While freight rail modal share declined across Europe, some countries and operators have managed to stabilize modal share—or even slightly grow it. Examples of successes highlight some key lessons which others can follow:

[8] *European Freight Scenarios and Impacts – Summary Report 2*, Fraunhofer Institute for Systems and Innovation Research (ISI), 2018.
[9] Comparative Industry Service, IHS Markit.
[10] *Les comptes des transports 2019*, French government Data and Statistical Studies Service (SDES), 2020.
[11] World total coal production,1971-2020, International Energy Agency (IEA), 2021.
[12] In the UK, rail freight's modal share dropped from 23 percent in 2013 to 17 percent in 2016, UK Department of Transport's statistical dataset for freight (TSGB04).
[13] Federal Statistical Office of Germany (Destatis); Deutsches Institut für Wirtschaftsforschung (DIW), *Verkehr in Zahlen*, Hamburg: Bundesministerium für Verkehr (Federal Ministry of Transport), 2000 and 2020.
[14] *Sidings in the German rail network* (*Gleisanschlüsse im deutschen Bahnnetz*), Deutscher Bundestag (Drs. 19/9305).
[15] Quel fret ferroviaire local ? Réalités françaises, éclairages allemands. La documentation française, 2009 ; NPI ; Cerema 2019.

Germany, for instance, increased rail's modal share from 16 to 19 percent over the last twenty years.[16] This was driven mainly by a significant growth in exports and the use of container transport from the country's ports to industrial centers in the mainland. However, this required a targeted push to boost modal share by investing heavily in rail infrastructure at key connection points over the last 25 years. For example, investments in the Port of Hamburg led to an increase in its rail share of hinterland container traffic from around 30 to just over 50 percent.[17]

In the United Kingdom, rail volume dropped by 28 percent, from 18 billion tkm in 1980 to 13 billion tkm in 1995, reflecting the loss of British hard coal and steel customers. But between 1995 and 2015 rail freight volume grew 46 percent to 22 billion tkm, because privatized players were able to attract new customer segments, particularly the construction industry, as well as service intermodal flows to and from ports.[18]

In Belgium and Poland, cargo units underwent privatization and were able to reorient their business models, thereby growing volumes while significantly cutting costs.

Austria has managed, over roughly 30 years, to keep its freight rail modal share just above 30 percent.[19] This was achieved through direct and indirect support for the industry. Such support includes subsidies for operations and investments; a differentiated tonnage limit for road transport that decreases the attractiveness of road transport for international freight transit; substantial tolls on highways; and weekend and overnight traffic bans for international transit.

Switzerland has followed a similarly rigorous approach, while also massively investing in rail infrastructure. For example, the new Gotthard Tunnel allows for longer and heavier trains thereby reducing costs. Swiss Railways expects this intervention to increase freight rail volumes between Switzerland and Italy by 20 percent.[20]

In addition to these European outliers, examples from the United States show that an industry consolidation can also have positive effects. The United States had 41 Class I railroad companies in 1978 but the market had consolidated to seven major players by 2020.[21] This improved railway companies' efficiency as well as profitability. They are now in a better position to innovate, have a more consistent pricing approach, and yield higher operating synergies, for example through better asset utilization. Furthermore, automated coupling—planned in Europe since around the 1970s and expected to be implemented from 2025 onwards—has been a US market standard for more than 100 years.[22]

The following three key lessons emerge from these success stories:

First, r*ailways could benefit from new dedicated target segments, convincing business plans, and concrete actions to increase modal share.* The industry needs to be cognizant of the fact that traffic will not shift gradually, and old volumes are gone. On a country level, Austria and Switzerland provide good examples of concrete plans to shift freight from road to rail. The British and Belgian success stories illustrate the kind of management excellence needed at a company level to move forward.

Second, *targeted infrastructure investment is key.* For instance, the Gotthard Tunnel and investment in the Port of Hamburg have each triggered a massive shift. By comparison, investments dispersed across European networks may have improved the situation, but have not been able to move the needle on modal share.

Third, *the industry requires bold regulatory moves.* Switzerland and Austria, for example, have

[16] Federal Statistical Office of Germany (Destatis).
[17] Port of Hamburg, Modal split in hinterland traffic 2020; *Entwicklungen im Containerverkehr in Hamburg und der Nordrange,* Port of Hamburg, 2005.
[18] *Nikolaos Zahariadis, Markets, States and Public Policy – Privatization in Britain and France*, University of Michigan, 1995; UK Department of Transport's statistical dataset for freight, (TSGB04).
[19] Statistik Austria, Bundesanstalt Statistik Österreich, 2021.
[20] *Schneller nach Italien – Gotthard-Basistunnel,* Eurotransport, 2015.
[21] The United States Surface Transportation Board, 2020.
[22] "Development of a concept for the EU-wide migration to a Digital Automatic Coupling System (DAC) for Rail Freight Transportation," German Ministry of Transport and Digital Infrastructure (BMVI), June 2020.

implemented a series of effective measures, which went beyond subsidizing rail on an incremental level.

A European rail freight transformation can focus on three key elements

A concrete transformation to successfully boost freight rail in Europe could focus on the following three elements: major transportation flows such as those between Spain and Central and Northern Europe; major connection points such as ports that handle a large proportion of the import and export flows; and new industries that could shift to rail and replace the volume lost by industries such as coal and steel.

West-East cross-border transportation flows

Huge volumes of goods are transported across the continent, but the majority move by road. There is an opportunity to focus on the largest flows and put interventions in place to shift these volumes to freight rail. Major flows move from Spain and Portugal, across France to countries in Central and Northern Europe, particularly Germany, Belgium, and the Netherlands. More than 40 billion tkm of road freight move across France per year, with an average transport distance of over 500km—this distance is the sweet spot for rail transport, yet only 5 percent is on rail. [23] Capturing 50 percent of this traffic would boost freight rail modal share in France by 5.5 percentage points, from 8.7 percent to 14.2 percent.

With dedicated investment and new business models, rail has a potential to win back a significant share of traffic, especially given consumer demand for supply chains which are more sustainable in terms of carbon footprint.

Ports on Europe's North-South axis

Ports play a major role in the transport of European goods, handling around 50 percent of imports and

[23] Eurostat, Annual road freight transport, by distance class.

The following strategic interventions could help to win traffic back for rail

— *Enabling seamless movement across borders.* There is a standard gauge connection to Barcelona, and beyond, through a new high-speed line; similar capacity could be added at border crossings such as Port Bou and Cerbere.

— *Increasing corridor capacity.* Connecting corridors, especially along the Mediterranean coast in France and Spain, need increased capacity to handle larger flows. Part of the solution could include adding European Train Control System (ETCS) equipment and removing level crossings.

— *Giving customers access points.* Standard gauge connections in Spain could be expanded so that key areas of origin, such as Almeria, have direct access to the standard gauge network. In addition, infrastructure investments need to incorporate high-capacity terminals which can handle 740m trains efficiently.

— *Offering attractive supply-chain solutions.* Appropriate supply-chain solutions—with clear benefits over road transport in terms of cost, reliability, and speed—could attract key industries. For instance, as a significant portion of traffic is made up of perishable agricultural products, rail will need to compete with door-to-door truck services that provide fresh food to customers. Solutions could include cold-chain services based on reefer containers, average train speeds of more than 80km per hour between terminals, and reliable schedules.

exports. Rail access to ports is therefore a crucial factor in fulfilling Europe's aspiration for freight rail. A good example is the Port of Hamburg. The port's long-term strategy of hinterland connectivity has always been a core pillar of its activities, enabling the port to increase its rail modal share to 51 percent (see sidebar, "The Port of Hamburg's success factors").

Other European ports could launch similar initiatives and upgrade infrastructure, as a core priority for increasing rail flows. Several of the major European import and export port hubs have very low rail modal share, for example, 17 percent in Felixstowe, 8 percent in Antwerp, and 7 percent in Valencia. Boosting those modal shares to the region of 40 to 50 percent would have significant impact on the overall modal share of rail freight in Europe.

New customer industries

There is an opportunity to attract new customers to rail, particularly by expanding market share in the paper and pulp, and battery industries. Today, around 300 million tons of wood are produced in the EU, and most of this is transported by truck over short distances to factories and production sites. According to our analyses, at least 20 percent is transported over longer distances, of 250 to 400 km, for which rail would be more suitable. Capturing these flows could potentially add 14 to 15 billion tkm to rail's modal share.

Another possibility could be to capture new European customers that produce batteries for electric vehicles. An average battery has a weight of around 300 to 500 kg for a mid-sized car. Given current production levels of around 20 million cars per year—and the fact that production of combustion engines will likely cease by 2040—this industry has the potential to add demand for around 5 billion tkm of freight rail per year.

Both wood and batteries are suitable for rail and are often located in specific regions. Putting these industries' logistics and supply chains on rail would require some targeted investments, including the establishment of sidings or direct access points to the rail network; measures to fully optimize last-mile

The Port of Hamburg's success factors

Four success factors seem to have helped the port to make rail attractive and increase modal share:

Opening up access to rail infrastructure. Opening tracks within the port to all railway operators increased shippers' willingness to move goods on rail as they could tailor their solutions with preferred partners. Service quality—for example, the frequency of train services—increased significantly. There are now 57 different rail transport companies using the port's infrastructure, with 1,300 trains per week going in and out of the port.[24]

Reducing infrastructure bottlenecks. The port improved both infrastructure and operations to speed up and increase capacity on rail services. It removed infrastructural bottlenecks, for instance by completing the Kattwyk railway bridge in 2020. This is one of the largest lifting bridges in the world, with a middle section that can be raised to allow ships to pass underneath. Dedicated to rail traffic, the bridge has increased capacity for rail services.

Cooperating closely in operations. The Hamburg port provides shunting services as well as joint traffic management with other companies, leading to increased operational efficiency.

Connecting the hinterland. Building rail infrastructure in the rest of the country was just as important as increasing infrastructure at the port, so the system could handle larger numbers of trains. Segments with third tracks and sidings have been added to handle 740m trains—and new freight arteries are planned for the future.

[24] *Hamburg Port Railways*, Hamburg Port Authority.

management; and a high level of service to bring both reliability and flexibility to cater to clients' needs.

Rethinking the regulation model

To support these big moves, regulators, alongside infrastructure managers and owners, could consider various actions on the following dimensions to support freight rail—beyond short-term subsidies—and set the foundation for a financially viable sector:

— *Integrate rail and road infrastructure charges.* Stakeholders could develop an integrated view and financing approach, across rail and road, that reflects similar costs. Today, significant costs of transport are externalized and born by society at large. However, road transport is responsible for a greater share of these costs. A 2012 report from the International Union of Railways (UIC) states that heavy duty vehicles are responsible for 14 percent of all external costs of transport in Europe, and light duty vehicles are responsible for 9 percent.[25] This figure is only 1 percent for rail. Establishing a level playing field would help companies choose the best transport mode, including being able to take sustainability issues into consideration.

— *Dedicate tracks to freight rail.* In Europe, passenger rail is prioritized over freight rail. Access to daytime slots, especially close to critical nodes such as Paris or Lyon in France, is almost impossible for freight trains. As the EU has a comparable ambition to grow passenger rail, this raises the question of additional rail capacity or even dedicated lines for freight. A European freight rail master plan—including dedicated projects, funding, and governance—could prioritize end-to-end projects across Europe.

— *Consider infrastructure as a public good.* The question of whether a road connecting two small villages is worth building is almost never asked; however, for more than 30 years, rail infrastructure operators have prioritized profitable lines over unprofitable ones based on the tolls they could generate. An alternative approach could be to determine the value of a specific line in the context of its ecosystem, including the industries, territories, and main lines it serves.

— *Enable new technology.* The technology to enable next-generation freight exists and has been on the market for several years, including track and trace, ERTMS, automatic coupling, and automated terminals. However, this is still being tested. For example, DB in Germany and SNCF in France are testing several automated coupling technologies—no standards have been chosen yet, and rollout is not expected for several years. Accelerating this process is key.

— *Revisit the European competitive framework.* The current operating model, including a privatized and liberalized market, leads to competition on marginal cost in an industry that already has a high fixed-cost share. The market has separated into various segments. There is a focus on highly competitive and profitable segments—such as long complete trains, and long distances—and on segments that can only be made profitable as a feeder for other transport, such as single wagon loads or short distances. Regional traffic, which incurs major losses, is thus usually only offered by big incumbents.

Operators could focus on customer orientation

Operators could play a role in reshaping the market. They could consider taking a more strategic approach to reorienting services to better meet customer needs. Over the last 10 to 20 years, operators have been focused on operational turnarounds. Changes in ownership have been driven mainly by the need to inject fresh capital or by the will to get rid of costly legacies and to run a more profit-oriented model. Examples include the Lineas private equity carve-out, IPO in Poland, Dutch Rail being taken over by DB Cargo, the majority interest

[25] *Greening transport: Reducing external costs*, International Union of Railways (UIC), June 1, 2012.

of CFL Luxembourg and of Comboios de Portugal being sold to major customers, and Swiss Cargo opening up ownership to private investors.

However, in comparable cases in other industries—such as express logistics, freight forwarding, telecommunications, airlines, and energy—there has been a rise in trans-national companies with an international footprint that outweighs their incumbent markets by far. This phenomenon is often driven by large cross-border M&A activity. Successful companies in these industries have significantly revisited their commercial models, improved customer experience across process steps, introduced flexible offerings, enhanced quality of service, and offered better pricing structures. Freight rail would also benefit from thinking through its marketing and customer relationship models, which have not seen significant changes over the past 50 years.

In this context, rail operators could explore four options for developing new market share:

— *Improve cost efficiencies* by using all possibilities to improve economies of scale, scope, and skills. For example, rail operators could create truly seamless networks across the EU; develop new operating models to cover the first and last mile; consider partnerships with other rail operators or new actors; and leverage new technologies such as automatic coupling to optimize operations, automatic processing to simplify back-office processes, and advanced analytics to optimize network planning and train scheduling.

— *Offer world-class service* by applying the latest technologies to enhance processes from customer generation through to pricing and after sales service. For example, rail operators could implement easy web-based booking solutions for end-to-end logistics across operators and infrastructure managers; apply advanced pricing approaches to attract volume; and optimize margins.

— *Develop competitive insights* by understanding the competition's value add for clients and their pricing approach. For example, rail operators could develop a clean sheeting tool for competitive modes, develop new tools to predict needs, and design select pricing points to offer a better value proposition to clients.

— *Proactively look for new clients* by developing new offerings to attract new types of goods to rail; and potentially developing partnership with companies willing to lower their carbon emissions and create a more sustainable operation strategy.

Doubling freight rail's modal share represents a significant challenge. It requires real will, strong choices, and an active involvement of all stakeholders, including states, regulators, operators, infrastructure managers, and industries.

Investing in technology, and modernizing the network, will be critical—but this is only part of what is needed to truly transform the industry. Regulators could also provide support, particularly in revising the competitive and financial model. And operators would benefit from rethinking their business models and coming up with innovative ways to attract new clients and deliver value.

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