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The 2015 European Railway Performance Index

Exploring the Link Between Performance and Public Cost



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The 2015 European Railway Performance Index

Exploring the Link Between Performance and Public Cost

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AT A GLANCE

This is BCG's second European Railway Performance Index (RPI) report. The RPI measures and analyzes three components of performance: intensity of use, quality of service, and safety. Regulators, national governments, and railway companies can apply the insights from this report to promote high performance.

RAILWAY PERFORMANCE IS GENERALLY STABLE

Overall, the results of our 2015 study are consistent with our first study, in 2012. For example, Switzerland, Sweden, France, and Germany are still among the countries with the best-performing railway systems, while ratings for safety continue to show the greatest variation among countries.

KEY PERFORMANCE DRIVERS: PUBLIC COST AND SUBSIDY ALLOCATION

We again found that a railway system's overall performance typically correlates with the level of public cost. We also found that the value that countries derive from their public cost typically correlates with the percentage of public subsidies allocated to infrastructure managers. Although not a magic bullet, an understanding of the most effective and transparent model for allocating public subsidies between infrastructure managers and train-operating companies can complement traditional performance-optimization levers.

FOR NATIONAL RAILWAY SYSTEMS in Europe, public subsidies provide essential funds to support infrastructure maintenance and passenger and freight operations. Some countries allocate the lion's share of public subsidies to either infrastructure managers or train-operating companies, while others allocate subsidies relatively evenly between these organizations. The use of different approaches throughout Europe raises a critical question: does the model for allocating public subsidies matter to a railway system's performance?

The answer could help European regulators, national governments, and railway companies as they seek to develop and implement policies to improve railway performance. Recent budgetary constraints have made it imperative to understand the most effective approaches for allocating public funds for railway modernization and development programs and other improvement initiatives. Moreover, the current operating environment demands action: concerns about railway safety are increasing throughout Europe at the same time as railway systems face rising, unsustainable levels of debt and delay much-needed investment programs.

The relationship between public funding models and railway performance is central to the analysis in BCG's 2015 European Railway Performance Index (RPI) report. BCG developed the RPI to provide a tool for measuring railway performance and to inform discussions among European stakeholders about priorities for action. To our knowledge, the RPI enables the most comprehensive benchmarking of European railway operations. Previous studies have focused on only one of three factors: productivity, the level of public expenditures, or the degree of market liberalization. The RPI, however, provides a holistic measurement that includes all three critical components of railway performance: intensity of use, quality of service, and safety. This comprehensiveness allows for isolation of the factors that drive high performance. As a result, the RPI provides valuable insights for stakeholders that seek to promote high performance of European railway systems.

In the first RPI report, published in 2012, we sought to understand what drives railway performance in general, with particular emphasis on whether there might be a link between high performance and market liberalization. (See *The 2012 European Railway Performance Index: Understanding What Drives High Performance*, BCG Focus, November 2012.) We found only weak correlations between performance and the degree of liberalization and between performance and the choice of governance model. Our key finding was that a railway system's overall performance typically correlates with the level of public cost, which we defined as the sum of public subsidies and investments in the system.

Does the model for allocating public subsidies affect railway performance?

Our current report confirms the correlation between performance and public cost. To probe more deeply into this correlation, we also examined the link between performance and how governments allocate public subsidies between infrastructure managers and train-operating companies.

Significantly, we found a correlation between the value that countries derive from public cost and the percentage of public subsidies that are allocated to infrastructure managers. The key takeaway: countries that get the most value from public spending on railway systems also allocate the highest percentage of subsidies to infrastructure managers.

These correlations do not mean that increased public spending or more effective subsidy allocation is a magic bullet for improving railway performance. Rather, our findings suggest that while traditional optimization levers—such as asset and network optimization, marketing effectiveness, operations performance, strategic workforce planning, and governance efficiency—should still be priorities, stakeholders in each country should closely examine the options for devoting a greater share of their public funding to support infrastructure managers.

Measuring Performance in Three Dimensions

The RPI measures railway systems' performance in three dimensions for both passenger and freight traffic:

- *Intensity of Use.* To what extent is rail transport used by passengers and freight companies?
- *Quality of Service.* Are the trains punctual and fast, and is rail travel affordable?
- *Safety.* Does the railway system adhere to the highest safety standards?

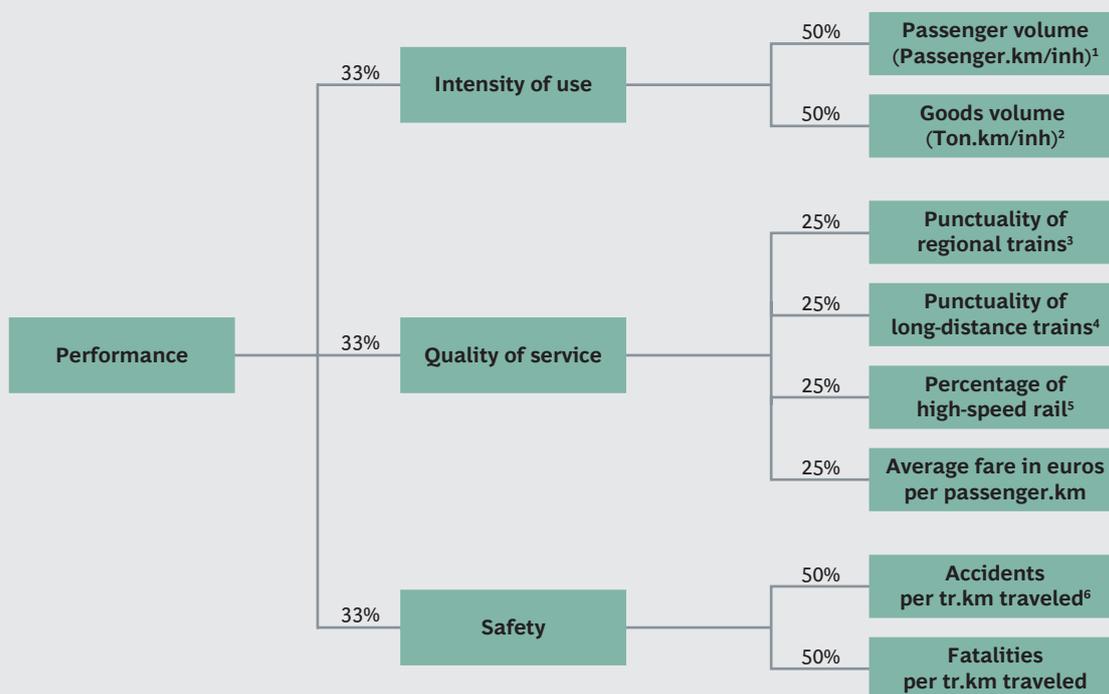
We confined the analysis to these dimensions to create an indicator that is comprehensive yet easy to understand. Each dimension comprises at least two subdimensions, and all were given equal weight. (See Exhibit 1.) We rescaled the data to represent a score out of ten for each subdimension. To create the index, we then combined the ratings for each dimension and subdimension based on their weighting.

The index's simplicity resulted in two methodological biases:

- Passenger performance is overweighted relative to freight performance because reliable information about the quality of service—especially in terms of price and punctuality—for freight operators is unavailable. Consequently, the RPI for a particular country may not necessarily reflect the high quality of that country's freight services.
- Large countries are favored relative to smaller countries because the quality-of-service dimension takes into account the share of high-speed-rail travelers. That is significant because high-speed travel is more common in countries with railway networks that cover long distances.

The RPI measures railway systems' performance in three dimensions.

EXHIBIT 1 | The RPI Comprises Weighted Measures Across Critical Dimensions



Source: BCG analysis.

Note: RPI = Railway Performance Index.

¹Passenger.km/inh: The number of passengers multiplied by the number of kilometers traveled, divided by the country's population.

²Ton.km/inh: Tons of goods multiplied by the number of kilometers traveled, divided by the country's population.

³Punctuality of regional trains computed as percentage of regional trains with less than a five-minute delay.

⁴Punctuality of long-distance trains, computed as a percentage of long-distance trains with less than a 15-minute delay.

⁵Percentage of high-speed rail, computed as high-speed rail's share of long-distance traffic (measured in passenger.km).

⁶Tr.km traveled: The number of trains multiplied by the number of kilometers traveled.

One caveat: the primary source for data used in this year's RPI is the International Union of Railways (UIC) 2012 database. Some countries, however, do not provide all the information that the UIC database requests. We were thus unable to include those countries in every analysis. Furthermore, due to the unavailability of data, Estonia and Greece were excluded from the RPI altogether.

Three Tiers of National Railways

Three groupings of countries emerged from the analysis:

- *Tier One (RPI of at Least 6 Out of 10)*. Switzerland, Sweden, Denmark, France, Finland, and Germany.
- *Tier Two (RPI Between 4.5 and 6)*. Austria, Great Britain, Czech Republic, the Netherlands, Luxembourg, Spain, Italy, Belgium, and Norway.
- *Tier Three (RPI Below 4.5)*. Slovenia, Ireland, Lithuania, Hungary, Latvia, Slovakia, Romania, Poland, Portugal, and Bulgaria.

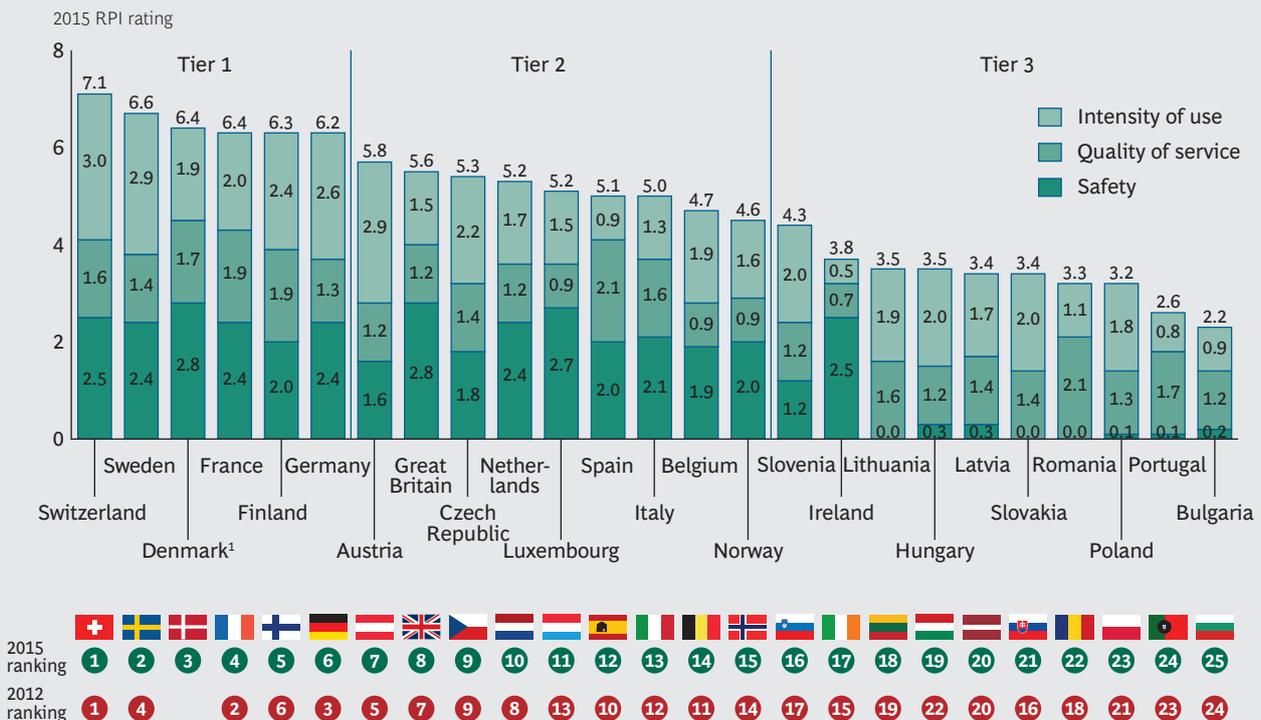
Exhibit 2 shows each country's performance, overall and for each of the three dimensions, as weighted in accordance with the methodology. For example, Switzerland's rating of 9.0 for intensity of use appears as 3.0 in the exhibit because each dimension contributes one-third to the overall rating. For comparison, the exhibit also shows each country's 2012 RPI ranking.

The 2015 rankings are generally consistent with the 2012 rankings. For example, tier one again includes Switzerland, Sweden, France, and Germany. Finland improved its ranking to join tier one, while Austria dropped to tier two. Denmark, which was excluded from the 2012 study owing to the unavailability of data, is also in tier one.

The consistency is attributable to the short period between the two studies—new policies designed to improve performance typically take longer than a few years to drive changes. Even the major railway accidents that occurred in Belgium, France, and Spain in 2013 did not affect safety ratings enough to significantly alter the RPI rankings.

As in the 2012 study, the ratings for safety show the greatest variation among countries. A country's ranking in tier three is often mainly attributable to a poor safety rating.

EXHIBIT 2 | Measuring Country Performance on the RPI



Source: BCG analysis.

Note: RPI = Railway Performance Index; individual data points have been rounded to the nearest tenth, so overall totals may vary by plus or minus one-tenth of a point.

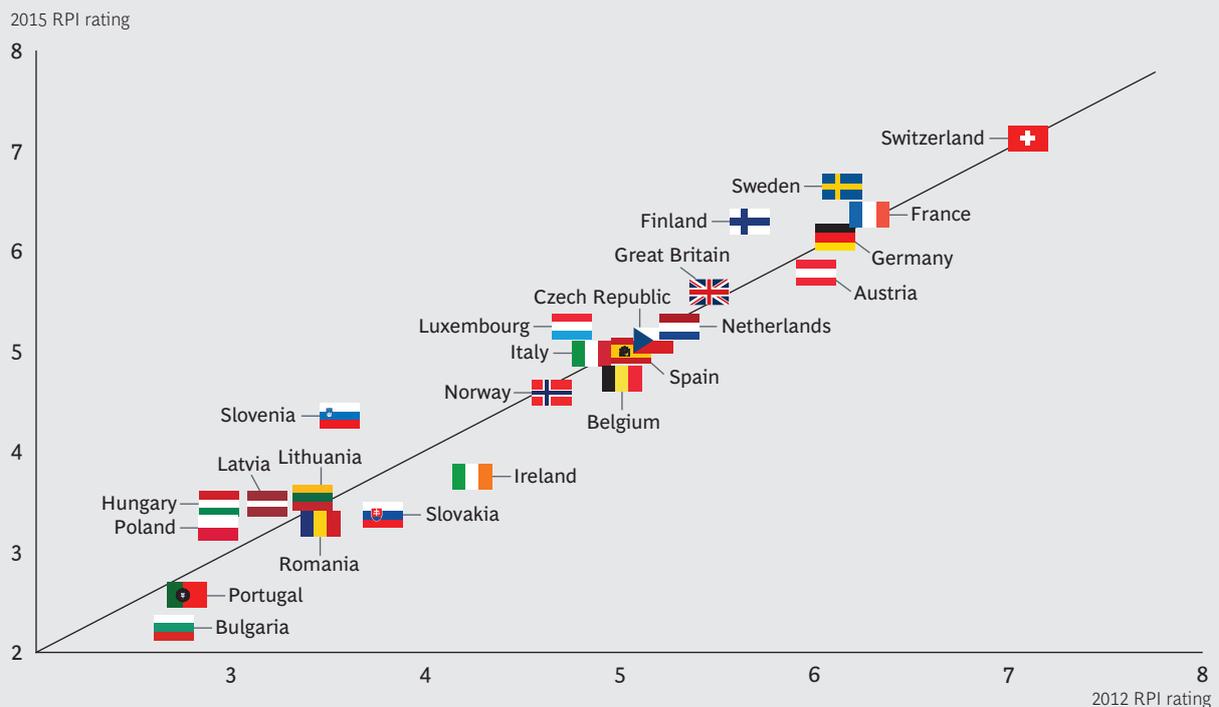
¹Denmark was not included in the 2012 RPI.

Most of the differences between the 2015 overall rankings and those of 2012 resulted from changes to ratings for safety and for quality of service rather than for intensity of use. Austria, for example, dropped out of tier one because of its relatively weaker performance in the first two dimensions. Intensity of use did affect rankings in some cases, but it did not figure prominently in determining either the 2015 rankings or the changes relative to 2012.

The consistency of the rankings is illustrated in Exhibit 3, which plots each country's RPI rating in 2015 against its rating in 2012. In the context of overall consistency, some changes are noteworthy:

- Belgium, Ireland, Slovakia, Portugal, and Bulgaria joined Austria in having lower ratings in 2015 because of their weaker performance in safety and quality of service. Indeed, Portugal and Bulgaria, already at the bottom of the rankings in 2012, fell even further behind in their relative performance.
- Sweden achieved a relative improvement in its quality of service. Finland and Slovenia each improved their ratings for safety and quality of service. Several other countries improved performance in at least one dimension: Luxembourg in intensity of use and safety, Hungary in intensity of use, Latvia in safety, and Poland in intensity of use and quality of service.

EXHIBIT 3 | RPI Ratings in 2015 Are Generally Consistent with Those in 2012



Source: BCG analysis.
 Note: RPI = Railway Performance Index.

Tier one countries perform well in at least two dimensions.

- Despite having a higher RPI rating in 2015, France fell from second place to fourth in the rankings as a result of Sweden's better relative improvement and the introduction of Denmark into the study. Germany fell from third place to sixth: although its rating for intensity of use improved and its safety rating did not change, its rating for quality of service declined.

Below, we discuss our findings for each tier. In describing a country's performance in each dimension, we consider "excellent" to be a weighted rating of 2.7 or above, "very good" to be 2.0 to 2.6, "good" to be 1.3 to 1.9, and "poor" to be less than 1.3.

Tier One Countries. Tier one countries perform well in at least two dimensions, although the results are not uniform.

- *Switzerland.* With a rating of 7.1 overall, Switzerland has an excellent rating for intensity of use, notably driven by passenger traffic. It also has a good rating for quality of service and a very good rating for safety.
- *Sweden.* At 6.6, Sweden has an excellent rating for intensity of use by both passengers and freight, and a very good safety rating. Although the nation's rating for quality of service is only good, that is an improvement over its level in 2012.
- *Denmark.* This country makes its first appearance in the RPI with a rating of 6.4 overall. It has an excellent rating for safety and good ratings for intensity of use and quality of service.
- *France.* At 6.4, France has very good ratings for intensity of use, which is driven by passenger traffic, and for safety. It has a good rating for quality of service.
- *Finland.* This country rises into tier one with a rating of 6.3. It has very good ratings for intensity of use by both passengers and freight and for safety, and it has a good rating for quality of service.
- *Germany.* At 6.2, Germany has very good ratings for intensity of use, driven by both passenger and freight traffic, and for safety. It has a good rating for quality of service.

Tier Two Countries. Tier two countries have high-performing railway systems overall. The similarity of their RPI ratings, however, obscures a wide range of results among the three dimensions.

Two countries in this tier have high intensity of use but lag in quality of service and safety:

- *Austria.* At 5.8, Austria drops to tier two in 2015. It has one of the highest ratings for intensity of use, driven by both passenger and freight traffic. However, its safety rating, while good, is the lowest outside the tier three countries, and its quality-of-service rating is poor.

- *Czech Republic*. With an overall score of 5.3, the Czech Republic has a very good rating for intensity of use, driven by freight utilization. It has good ratings for quality of service and safety.

Three countries in this tier have high ratings for safety but relatively low ratings for intensity of use and quality of service.

- *Great Britain*. This country has an overall rating of 5.6. It is tied with Denmark for the highest safety rating, but its rating for intensity of use is just good because of low levels of freight utilization. Its quality-of-service rating is poor.
- *The Netherlands*. With a score of 5.2, this country has a very good safety level, but its good rating for intensity of use stems from low freight utilization. Its quality-of-service rating is poor.
- *Luxembourg*. At 5.2, Luxembourg has an excellent safety level. However, it has only a good rating for intensity of use because of low freight utilization and a poor quality rating stemming from the high price of service.

Two countries in tier two perform well with respect to safety and quality but have low ratings for intensity of use, especially by freight:

- *Spain*. With a score of 5.1, Spain has very good ratings for safety and quality of service, notably because of its high-speed service. But it has a poor rating for intensity of use, stemming from low freight utilization.
- *Italy*. At 5.0, Italy has a very good safety level but only good ratings for quality of service and intensity of use because of low freight utilization.

The remaining countries in tier two—Belgium, at an overall rating of 4.7, and Norway, at 4.6—have good or very good ratings for intensity of use and safety but poor ratings for quality of service.

Tier Three Countries. Almost all the tier three countries have poor safety ratings. The exception is Ireland, whose safety rating is among the highest in the index. Ireland’s overall rating of 3.8 stems from very low ratings for intensity of use and quality of service.

Levels for quality of service are poor or good among the rest of the tier three countries, except for Romania, which has a very good rating. Intensity of use is good or very good for six countries: Slovenia, Lithuania, Hungary, Latvia, Slovakia, and Poland. However, three countries—Romania, Portugal, and Bulgaria—have poor ratings for intensity of use.

Key Performance Drivers: Public Cost and Subsidy Allocation

What explains the performance ratings we derived from the RPI? To explore this question, we focused on public cost and subsidy allocation as key drivers of performance.

Almost all the tier three countries have poor safety ratings.

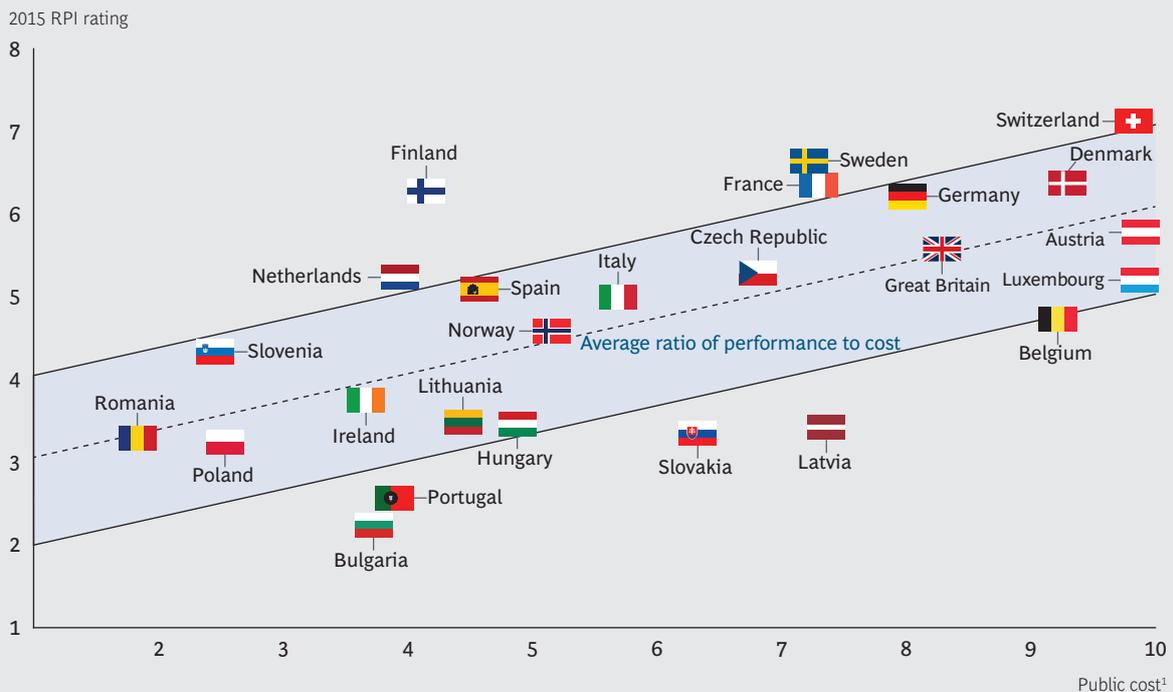
We began the analysis by comparing each country’s overall RPI rating with its public cost, which, again, we defined as the sum of public subsidies and investments in the system. Public subsidies are recurring government contributions that support passenger and freight operations and infrastructure maintenance. Public investments are one-time government investments in infrastructure construction projects.

Because public investments are project-based expenditures, we used the average annual public investment over the six-year period from 2007 through 2012. To capture the amount of public investment more comprehensively, we adjusted the average annual investment figure to include the cost of servicing debt and the amount of anticipated future investments (these adjustments were not made in the 2012 study). We then converted the public cost to per capita figures for each country—thousands of euros per inhabitant—and normalized the figures on a scale of 0 to 10.

Overall, as in 2012, the analysis shows a correlation between public cost and a given railway-system’s performance level as measured by the RPI. (See Exhibit 4.)

However, the analysis also reveals differences in the value that countries receive in return for their public costs. Switzerland, Germany, France, Sweden, Finland, and

EXHIBIT 4 | RPI Ratings Correlate with Public Cost, but Some Countries Get More Value for Their Money



Source: BCG analysis.

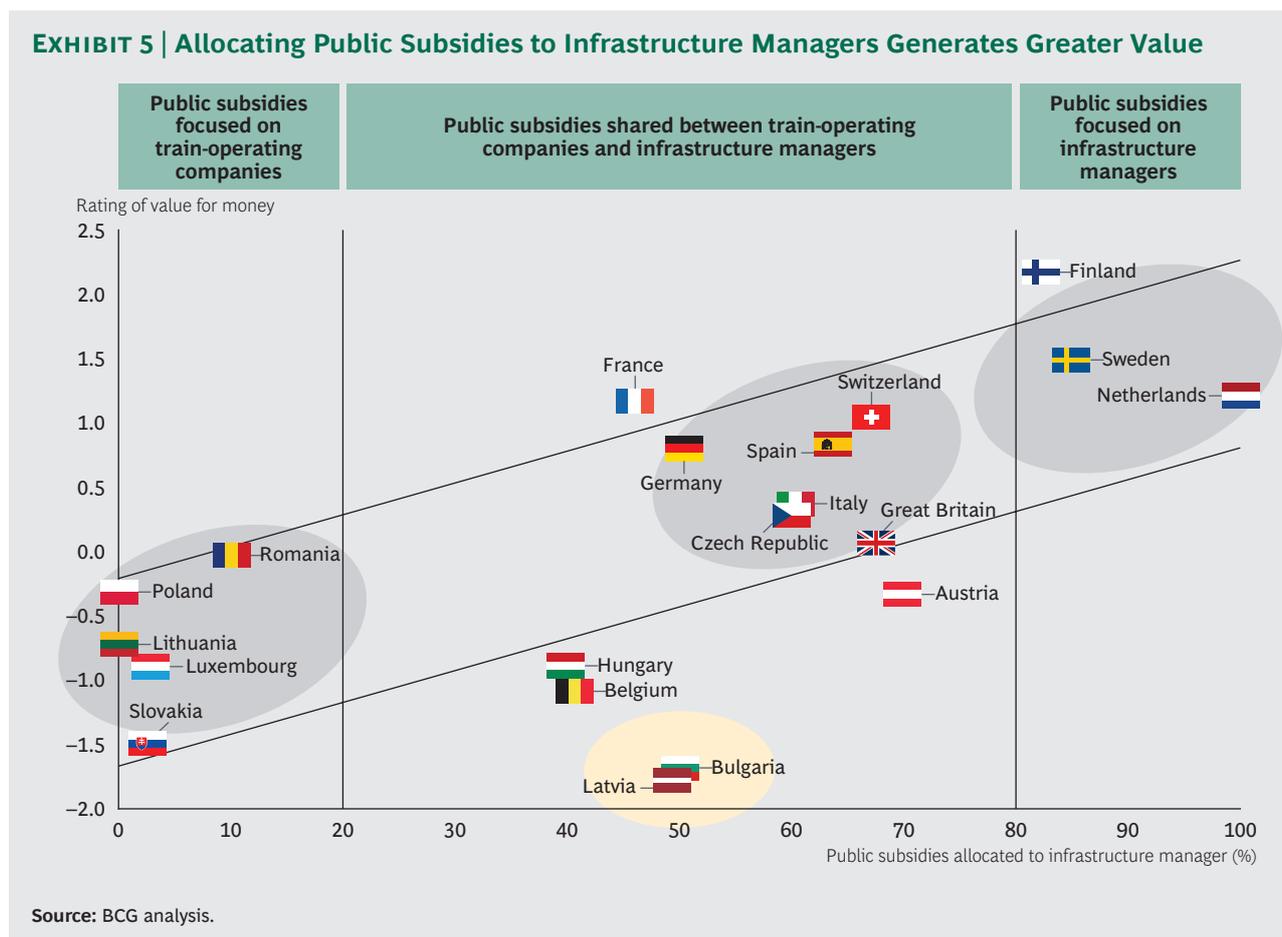
Note: RPI = Railway Performance Index; public cost is the sum of public subsidies and investments, and it includes cost of debt and expected future investments.

¹Public cost is expressed as thousands of euros per inhabitant, normalized on a scale of 0 to 10.

the Netherlands capture relatively high value for their money. These countries outperform relative to the average ratio of performance to cost for all countries—that is, they achieve high performance at a lower cost per capita than do the other countries. In contrast, Latvia, Slovakia, Portugal, and Bulgaria get relatively low value for their money—these countries underperform relative to the average ratio of performance to cost.

We sought to understand what might explain these differences in value derived from public cost. We hypothesized that the differences could be linked to the way a country allocates public subsidies between infrastructure managers and train-operating companies. To test this, we analyzed the correlation between value derived from public cost and the percentage of public subsidies allocated to infrastructure managers. It should be noted that Denmark, Ireland, Norway, Portugal, and Slovenia were excluded from the analysis because comprehensive data was not available.

We found that value correlates with allocating a larger percentage of public subsidies to infrastructure managers. (See Exhibit 5.) In other words, countries with the best-performing railway systems in terms of value from public cost generally allocate a higher percentage of subsidies to infrastructure managers.



Notably, France and Germany obtain relatively high value despite allocating subsidies fairly evenly between infrastructure managers and train-operating companies. These countries have high RPI ratings, which result from their size, their railway systems' intensity of use, and their history of investing to build and maintain world-class railway systems. Stakeholders in these two countries should consider whether they could obtain even greater value for the money by increasing the share of total subsidies allocated to infrastructure managers.

Austria, in contrast, gets relatively low value despite allocating approximately 70 percent of subsidies to infrastructure managers: the high public costs for the nation's railway system make it harder to get value for the money. Similarly, the very low value ratings for Bulgaria and Latvia are attributable to the costly investment programs planned in these countries.

The overall correlation between value for the money and subsidy allocation can be explained by considering how subsidy allocation affects costs and performance: directing subsidies to infrastructure managers allows companies to charge lower rates to train operators for the use of the infrastructure. Having a lower cost base and relying less on subsidies allows train operators, in turn, to offer services at lower prices and gives them greater flexibility in running their operations and implementing performance improvements—which ultimately promotes a higher RPI rating. Moreover, a country's railway system benefits from the improved efficiency and visibility that result from a transparent subsidy structure, in which public subsidies are provided directly to the infrastructure manager rather than spread among multiple train-operating companies. Infrastructure managers can spend the funds in ways that will create the most value, giving consideration to the priorities for the entire national railway system—provided that their governance and operating model allows them to identify and execute those priorities. It is also easier for the national government to oversee the use of funds and thereby help to ensure that they are spent on valuable projects.

WE WANT TO emphasize that we found merely a correlation—not a direct cause-and-effect connection—between railway performance and the model for allocating public subsidies. Other factors, such as a system's historically high performance and a country's consistently high investments in the system over time, play strong roles in determining the extent to which public spending on railway systems generates value for a country. Variations in how railway systems have applied traditional optimization levers—such as asset and network optimization, marketing effectiveness, operations performance, strategic workforce planning, and governance efficiency—also contribute to current differences in performance.

The correlation does suggest, however, that regulators, governments, and railway companies should jointly consider the options for increasing public support of infrastructure managers—whether by increasing the amount of public subsidies overall or the percentage allocated to infrastructure managers. By obtaining a better understanding of the most effective and transparent model for allocating public subsidies, European stakeholders may gain valuable insights into what drives railway performance.

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