Years of thin investment have stalled Germany's vaunted rail network as China's speeds ahead

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Twenty years ago, Germany was selling high-speed trains to China. Today, its rail network is slowing to a crawl while China's continues to improve and speed up.

Wang Xixi still remembers her first experience with Germany's trains 21 years ago. It left her with a question: how could a railway be so empty, clean and punctual, and still make money? The carriages were bright, the toilets almost spotless and the fittings modern. During four years as a student in Bavaria, travelling on a regional rail pass, she barely remembers a delay.

At the time, China's high-speed railway network was just getting started, while Germany was a major exporter of the technology. In 2005, Siemens sold China 60 trains capable of 300km/h (186mph).

Wang never expected that, years later, delays would become routine on Germany's railways – sometimes minutes, sometimes hours. The reasons run the gamut: a train ahead blocking the track, faulty points, signal failures, speed restrictions imposed where tracks have worn out. Most point back to an ageing and overloaded network.

Wang began travelling regularly between Berlin and Frankfurt for work in 2022. "Now I don't remember a single trip that wasn't delayed," she said. To make sure she arrived in time for a meeting, she had to take a 5am train and leave two or three hours of extra time. Sometimes she flew instead. "It's such a short distance, and flying is terrible for emissions," she said. "But there was really no other way."

Her experience with China's railways has been the complete opposite. In 2001, Wang travelled with her father from Xian to Beijing on an overnight train, a roughly 1,200km (746 miles) journey that took more than 12 hours in a crowded carriage. Today, the fastest train covers the same route in just four hours and 11 minutes. "Convenient, clean, quick," she said of travelling by train in China today.

The numbers bear her out. Over the same two decades, China has built the world's largest high-speed railway network, with more than 95 per cent of trains on time, according to the World Bank. Germany's long-distance punctuality, by contrast, has hovered around 60 per cent for three years and fell to 52.6 per cent this summer.

The contrast points to a deeper gap between China and Germany: Beijing can commit to long-term investment in key infrastructure such as high-speed railway lines and see it through, while Berlin struggles both to sustain the investment and to deliver the projects needed to maintain and upgrade its railway system, with growing consequences for competitiveness.

China laid nearly 50,000km of high-speed track in less than two decades, at about two-thirds the cost per kilometre of other countries, according to the World Bank, which credits a 15-year

railway plan backed by successive five-year plans. Such a model, it notes, depend on a government willing and able to commit to a decades-long programme.

“Rail investment in China has stayed high year after year,” said Li Hongchang, a professor of transport economics at the Sustainable Transportation Innovation Centre at Beijing Jiaotong University. It has topped 700 billion yuan (US$104.3 billion) a year for the past decade, and reached 901.5 billion yuan last year, according to state-owned operator China State Railway Group.

To sustain investment on that scale, public financing and government backing were essential, Li says. Alongside central and local budgets, a state-approved railway construction fund levied on freight since 1991 raises about 60 billion yuan a year. He describes this as a steady and critical source of funding that also guarantees the operator’s construction bonds.

The railway system borrows heavily on top of that, backed by its state ownership and passenger revenue. China Railway had 6.2 trillion yuan in liabilities at the end of 2024, with a debt-to-asset ratio of 63.5 per cent, according to its annual report.

Li estimates that the cost of public service obligations – covering loss-making services required by the state, from thinly used lines and discounted fares for students and disabled veterans to disaster relief transport – amounts to about one quarter of annual railway spending.

Debt on that scale brings its own problems. Analysts have long questioned its sustainability and how long it will take to pay down. Lu Dadao, an economic geographer at the Chinese Academy of Sciences, wrote last year that only a few lines on China’s east coast were breaking even.

“But we also need to look at the wider benefits it brings,” Li said. His study of 200 Chinese cities found that the boost to economic output provided by high-speed railways substantially outweighed their large fixed costs, depreciation and subsidies. Still, bringing down the debt would require deeper market reforms and new sources of revenue, he adds.

China’s approach stands in contrast to Germany’s, where a constitutional provision has tightly limited government borrowing since 2011. Deutsche Bahn (DB), the main rail operator, is wholly state-owned but operates like a private company, with each of its subsidiaries under pressure to limit losses. Before the pandemic, it was largely profitable.

But years of thin investment are now catching up with Germany in the most visible form: an ageing rail network causing greater economic knock-on effects. Unlike China, Germany has struggled for years to invest enough money to maintain and modernise its railway system, despite efforts in recent years. Labour shortages and bureaucracy have added to the problem, analysts said.

“Too full, too old and too prone to faults” is how DB board member for infrastructure Berthold Huber described the network in an interview with the *Suddeutsche Zeitung* newspaper in 2023.

Since the mid-1990s, passenger traffic has risen more than 45 per cent and freight by about 90 per cent, according to DB, while the network has shrunk from 40,800km to about 33,500km. Fast and slow trains share the same tracks, causing delays to ripple across the network. The cause is

years of underinvestment, even though DB's annual infrastructure assessments long insisted the network was in good shape.

"They all said everything is fine," said Christian Boettger, a rail economist at HTW Berlin University of Applied Sciences. It was only in June 2022 that the government and DB admitted the network had been "pushed to its limit", announcing an overhaul of its busiest corridors.

Revamping those lines comes with a considerable bill. Last year, the cost of replacing worn-out tracks, signals and bridges stood at about €106 billion (US$120.6 billion), up from €92 billion in 2023, according to DB InfraGO, the group's rail infrastructure company.

To reverse decades of underinvestment, Berlin set up a €500 billion special fund for infrastructure and climate neutrality last year, exempt from the constitutional debt brake. The railway network is a major beneficiary, with €18.8 billion earmarked for it this year.

But several estimates suggest that part of the fund's infrastructure spending is not additional at all, Boettger said. The German Economic Institute said in September last year that €13.7 billion had been cut from the core rail budget compared with 2024, meaning much of the €18.8 billion from the fund replaced existing spending rather than adding to it, contrary to the government's pledge that the money would be strictly additional.

And more money did not solve a shortage of workers, Boettger said. The network could handle about 9,000 construction sites at a time, he said, but it ran 26,000 last year. "The entire system is overwhelmed," he said.

Meanwhile, the timetable for fixing the network keeps slipping. Germany began overhauling its 40 busiest and most delay-prone corridors two years ago, with completion initially due in 2030 before being pushed back to 2036.

Even completed projects have fallen short. The Berlin-Hamburg line reopened in June after nearly a year of closure. "Punctuality afterwards was not better than before. We now have a punctuality of 25 per cent," said Markus Hecht, a professor of rail vehicles and former institute director at the Technical University of Berlin. "It's absolutely horrible."

All of this comes as Germany loses ground to China in key industries. Berlin has hardened its trade stance, blaming subsidies, overcapacity and an undervalued yuan in China for imbalances squeezing German business. But economists and industry groups argue that tariffs alone will not restore competitiveness.

Lagging infrastructure, high energy prices and bureaucracy are leaving Europe behind, Germany's car industry association said this month. The group has long argued that politicians must do their own "homework" first.

"The problem is not only the railway, but public infrastructure as a whole," explains Shi Shiwei, a professor at the University of International Business and Economics in Beijing who recently completed a stint as a guest lecturer in Berlin.

At a conference on Germany's infrastructure crisis this month, which the country's transport minister attended, Shi recalled an executive asking: "Half the trains are late, the roads are falling apart, and hundreds of bridges need rebuilding. Why has none of this been dealt with?"

The strain is showing up in business. A record 84 per cent of firms surveyed by the German Economic Institute in October last year said poor transport infrastructure regularly hampered their business. Among those affected, 71 per cent pointed to the railways – the first time more than half of all respondents had cited the network as an obstacle.

In a speech on September 15, German Chancellor Friedrich Merz cited the €500 billion fund and a new law to speed up infrastructure approvals. "All of this will become tangible and visible in the coming months," he said.

But analysts and industry figures are less convinced, particularly when it comes to the railways. The harder question, they say, is whether Germany could sustain investment whose benefits might take years to materialise, well beyond the country's four-year election cycle.

In August, official figures still put long-distance punctuality below 55 per cent. The delays have become a cultural punchline – when someone arrives late to an event, people sometimes quip that "Deutsche Bahn is coming".

Wang, the rail traveller, had a joke of her own about the situation. "Maybe they need a Chinese-style five- or 10-year plan."