



CASE STUDY

Fast track to high-speed rail Republic of Korea's Train eXpress

Key points

- *The Korean Train eXpress, or KTX, has become a competitive and reliable mode of medium- to long-distance intercity transportation.*
- *Investment in the KTX, which constituted a major change in government policy from the previous focus on road infrastructure, has helped revitalize the railway industry and its competitiveness.*

There was a problem...

The KTX Gyeongbu (Seoul–Busan) high-speed rail line was commissioned in 1992 to service excess demand for transport along this corridor, which was home to about two thirds of the country's population and nearly three quarters of its gross national product generation. Some 66 per cent of passengers and 70 per cent of freight traffic ran through the Seoul–Busan corridor, and existing infrastructure was not capable of supporting the increasing transportation demand –highways were experiencing congestion and conventional rail lines could not add train capacity.¹

What was done?

The Government decided to invest in the construction of a new high-speed railway connecting Seoul and Busan in 1992 along with the electrification of the existing Homan line (Daejon–Mokpo) to expand the high-speed rail network.² The total cost of the projects was approximately US\$17.6 billion. The Government contributed 45 per cent of the cost for the KTX project (10 per cent in loans and 35 per cent in grants). The rest of the funding came from the Korea High Speed Rail Construction Authority (KHRC) – 29 per cent from bonds, 24 per cent from foreign loans and 2 per cent from private capital.³

Results

The KTX train sets have 935 seats spread over 18 passenger carriages.⁴ The two lines serve an average of more than 100,000 users daily, and trains can reach maximum speeds of 300 kilometre per hour on sections of the 238.6 kilometre of new track (34 per cent of the total KTX track).⁵ In its second year of operation, the Gyeongbu line had an average load factor of 85 per cent and the Honam line had 57 per cent.⁶

The difference it made

Rail times: Since the completion of the first and second phases of the KTX service, rail transit time from Seoul to Busan dropped by 53.6 per cent to 1 hour and 56 minutes. The electrification and introduction of high-speed rail

¹ Nam-Geon Cho and Jin-Kyu Chung, "High speed rail construction of Korea and its impact", *KRIHS Special Report Series* (Anyang, Korea Research Institute for Human Settlements, 2008).

² Chun-Hwan Kim, "Transportation revolution: The Korean hi-speed railway", *Japan Railway & Transport Review* 40 (Tokyo, 2005).

³ *ibid.*

⁴ *ibid.*

⁵ Kyung Chul Lee, "Launch of Korean high-speed railway and efforts to innovate future Korean railway" *Japan Railway & Transport Review* (2007) 48.

⁶ Nam-Geon Cho and Jin-Kyu Chung, "High speed rail construction of Korea and its impact", *KRIHS Special Report Series* (Anyang, Korea Research Institute for Human Settlements, 2008).

trains on the Honam line reduced the rail travel time from Seoul to Mokpo by 35 per cent, to just 2 hours and 58 minutes. The efficiency of the KTX has been a major boon for Korail (Korea Railroad) – by bringing in about a third of the total rail passengers, the KTX brought in approximately two thirds of the Korail's income.⁷

Air travel: Demand and supply of air service between the cities served by the KTX declined substantially with its opening: between 27.8 and 78.7 per cent decline, depending on the origin and destination cities.⁸ Flights between Seoul and Daegu, for example, dropped from 2,903 flights serving 338,559 passengers in the eight months before KTX opening to just 375 flights serving 27,854 passengers during the same period two years later⁹ – a remarkable 92 per cent reduction in passengers. At the same time, more than 70 per cent of travel switched from air to rail within the first months of KTX service.¹⁰ The total CO₂ emissions from domestic aviation began to drop¹¹ after 2004 – an 87 per cent decrease from 2004 to 2008.¹²

Ground transport: Car travel on express roads (measured by toll-gate traffic volume) dropped slightly for shorter distances served by the Seoul-Busan line and more significantly as distance increased (17.3 per cent reduction from Seoul to Busan). The express bus service experienced a similar but more pronounced pattern of reduced use in the first five months of the KTX operation (32 per cent reduction in trips from Seoul to Daegu and 35.5 per cent from Seoul to Busan).¹³

Future plans

Track upgrades are in progress to improve the speed and service of the Gyeongbu and Honam lines to further increase the high-speed rail system's capacity and efficiency in relation to car or air transport alternatives. The Honam KTX line, until now running on upgraded conventional track, will operate on a new high-speed rail line by 2014.¹⁴

Further reading

High speed rail construction of Korea and its impact, by Nam-Geon Cho and Jin-Kyu Chung, KRIHS Special Report Series (Anyang, Korea Research Institute for Human Settlements, 2008).

⁷ Kyung Chul Lee, "Launch of Korean high-speed railway and efforts to innovate future Korean railway" *Japan Railway & Transport Review* (2007), No. 48.

⁸ Sunduck Suh and others, "Effects of Korean train express (KTX) operation on the national transport system" *Proceedings of the Eastern Asia Society for Transportation Studies* (2005), vol. 5, pp. 190 – 198.

⁹ Nam-Geon Cho and Jin-Kyu Chung, "High speed rail construction of Korea and its impact", *KRIHS Special Report Series* (Anyang, Korea Research Institute for Human Settlements, 2008).

¹⁰ Dong-Chun Shin, *Recent Experience of and Prospects for High-Speed Rail in Korea: Implications of a Transport System and Regional Development from a Global Perspective* (Berkeley, Institute of Urban and Regional Development, UC Berkeley, 2005). Available from <http://iurd.berkeley.edu/publications/wp/2005-02.pdf> (accessed 15 November 2011).

¹¹ There may be exogenous explanatory factors for the decrease in emissions beginning after 2004.

¹² International Energy Agency (IEA), *Transport Greenhouse Gas Emissions: Country Data* (Paris, IEA/OECD, 2010).

¹³ Sunduck Suh and others, "Effects of Korean train express (KTX) operation on the national transport system" *Proceedings of the Eastern Asia Society for Transportation Studies* (2005), vol. 5, pp. 190 – 198.

¹⁴ Nam-Geon Cho and Jin-Kyu Chung, "High speed rail construction of Korea and its impact", *KRIHS Special Report Series* (Anyang, Korea Research Institute for Human Settlements, 2008).