SUMMARY

This study carried out a survey of 60 transport investment projects and an extensive meta-analysis to increase understanding of success factors for large transport corridor projects. It sought to identify which features could boost a corridor project’s potential for generating wider economic benefits, which extend beyond trade and efficiency gains to include factors such as economic welfare, reduced inequality and environmental benefits. The analysis linked detailed project characteristics to institutional success ratings and measures of subsequent economic activity around the corridors. Through meta-regression, researchers linked project characteristics to the likelihood that a project would produce wider economic benefits (measured through expert ratings) and to levels of economic benefits subsequently achieved (measured through data on nightlights and human settlement near and further away from the project location).

This analysis found that initial conditions – such as a country’s size, terrain, level of development and geographic location – do not seem associated with the success of a corridor project in setting preconditions for wider economic benefits (with “success” rated by international development organizations and experts). In contrast, increases in economic activity near the corridor project are significantly associated with initial conditions. The results suggested that increases in economic activity near corridor projects tend to be larger in smaller, less-developed countries with smoother terrain and direct access to the sea. The analysis also found that implementing reforms to promote industrial and trade competitiveness and improve governance before undertaking a corridor project...
could also help projects spur greater economic activity. Based on a methodology replicable in other contexts, these findings can help policymakers target investments in transport corridor projects to optimize wider economic benefits.

**CHALLENGE**

Trunk transport corridors play a crucial role in connecting people with goods and services and fostering regional connectivity. Improved transport infrastructure is known to generate wider economic benefits, including social inclusion, reduction in inequality, environmental benefits and economic resilience. These wider benefits reach not only large corporations, but also smaller, localized ones and poorer people. Improved transport corridors generate benefits through four key mechanisms: reducing transport and production costs, expanding productive capacity, improving access to markets and basic services, and reducing the prices of final goods and services. However, these benefits depend on supportive conditions in other sectors, such as access to credit, functioning land markets, low trade barriers, and accessible and quality health care and education. This has fueled questions about how best to obtain wider economic benefits from major transport corridor investments.

While it is well understood that a holistic approach to transport corridor development is needed to maximize wider economic benefits, policymakers currently lack detailed analysis of how and when to design transport infrastructure projects to reap these benefits.

Complementary investments in areas such as trade facilitation and transport services (warehouses, border crossings, and truck, rail and port services) can amplify the economic benefits of transport investments. Benefits from improved regional connectivity can be further expanded if project designs also make complementary interventions in other sectors, to ensure capital, labor, land and product markets function smoothly. The wider economic benefits of a trunk transport project can also depend on initial conditions, such as geography, population, development level and market efficiency. If designed without consideration of these complementary factors, transport corridors risk failing to attract the expected traffic and generate positive benefits to the wider economy.

This study by World Bank researchers sought to highlight aspects of project design and implementation that could matter most for the economic success of large transport corridor investments.

**INNOVATION**

To assess the characteristics of transport corridor project design and implementation correlated with wider economic benefits, the project team developed a survey tool to collect data on large transport projects supported by three international development organizations: the Asian Development Bank, the Japan International Cooperation Agency and the World Bank. The tool screened for eligible corridor projects, cataloged their basic characteristics, surveyed their designs, reviewed economic analyses of the projects, summarized project monitoring and evaluations, and assessed project performance using institutional indicators as well as expert opinions. To the team’s knowledge, the study was the first attempt to analyze transport corridor projects supported by international development organizations.
since 1980, linking project investments to performance using meta-analysis.

The data collected covered 60 projects involving investments in roads, rail or waterways in 23 countries, from 1984 to 2011. The projects covered both domestic and international corridors, totaling US$16.6 billion (in 2016 dollars), covering at least 100 linear kilometers, or involving a new bridge or tunnel connecting at least two economic centers and costing more than US$50 million. The sample spanned 40 road projects, 15 rail projects, two inland waterways projects and three mixed projects, based largely in Asia, although the World Bank portfolio spanned five regions of the world. These data were analyzed to test four hypotheses. Are projects more or less successful when they:

• are initiated in countries that are richer, bigger and easier to connect
• have a large geographic scope and strong theory of change
• engage or involve the private sector
• are accompanied by complementary policies and institutions?

The study tested the hypotheses through regression models that investigated which initial conditions, project characteristics, design attributes and complementary policies were correlated with project performance and wider economic benefits. Four metrics were identified for project success. Two captured the likelihood that a project produced wider economic benefits – institutional project completion ratings and expert success ratings – while two were used as proxies for increased economic activity – nightlights data and human settlement data. The researchers compared average nightlights and human settlement levels in areas 0-20km from the corridor with control areas 90-100km away. They then compared the difference between the two areas across time to ascertain a project’s effect.

The analysis considered three key categories of variables:

• Initial conditions – captured through a country’s area, ruggedness of terrain and GDP per capita when the project was appraised (in constant 2010 US dollars).
• Project design and characteristics – captured through quality of theory of change (rated by experts), whether or not the private sector was consulted and the degree of private sector involvement, the increase in connectivity, whether or not there was investment at a country border, geographic scope (from local to international) and whether or not a country was landlocked.
• Complementary policies and institutions – captured through trade openness at approval (imports plus exports, as share of GDP), government effectiveness at approval (measured by the Worldwide Governance Indicator) and whether the World Bank had any Development Policy Operations (DPOs) in the country during the five years before project approval.

RESULTS

Despite variations in findings between the two metrics for project success (likelihood of wider economic benefits and economic activity), the analysis suggested overall that smaller developing countries with smoother terrain, access to the sea, openness to foreign trade and effective governance could experience a greater boost in economic activity near transport corridor projects. More tentatively, the quality of
engagement with the private sector may need to improve if corridor projects with private participation are to generate widespread increases in economic activity. Complementary policies that improve trade, industry and health care are also associated with increases in economic activity along the transport corridors.

**Likelihood of wider economic benefits**

The regression analysis of institutional project completion ratings and expert success rating found that initial conditions were not significantly associated with a project’s success. However, project characteristics and design were significant, with a strong theory of change consistently associated with setting the conditions for wider economic benefits. The degree of private sector involvement had a negative association with project success, while pre-project financial, industrial and trade reforms had a positive association. However, public administration reforms had a negative association, possibly reflecting ongoing weaknesses in a country’s implementation capacity, or centralized reforms diverting resources from the transport sector implementing the corridor projects.

**Measured economic activity**

The regression analysis for human settlement and nightlights data revealed a significant increase in activity in areas up to 20km away from completed transport corridor projects, compared to control regions 90-100 km away. However, this could be a reallocation of economic activity from another area, instead of newly generated activity. Four initial conditions were significantly associated with the increase in economic activity near corridor projects: a country being smaller, having flatter terrain, having lower per-capita GDP and being coastal. Certain project characteristics were also significantly associated with changes in economic activity. Building new infrastructure or upgrading existing transport facilities were associated with a larger increase in economic activity than rehabilitating infrastructure. Reforms promoting industrial and trade competitiveness implemented before a corridor project were associated with increased economic activity near the corridor.

Based on a methodology replicable in other regions and contexts, these findings can help policymakers and development actors target investments in transport corridor projects to optimize wider economic benefits.

**LESSONS LEARNED**

Investing time in a carefully designed, structured approach to data collection, methodology and benchmarking enabled the project to achieve robust results.

- **Attempt, evaluate, optimize, repeat**
  The project began with a pilot for collecting relevant data, with constant evaluation of what information was feasible to glean and comparable across corridor projects. Only when the approach had been adjusted accordingly was the full-scale data collection designed.

- **Structure data collection for useable results**
  The design of a structured questionnaire, with a manual to collect data on projects financed by three different international organizations, and inputs from experts involved, proved very useful to ensure consistency in the data.

- **Allow time for design and benchmarking**
  Invest time in developing a rigorous
approach that can be used sector-wide to create a public good. To identify a robust set of results, several measures of project success should be used.

For more details, see The Web of Transport Corridors in South Asia, Chapter 3, https://openknowledge.worldbank.org/handle/10986/28882,

The study analyzed transport corridor projects covering at least 100 linear kilometers (defined above), or involving a new bridge or tunnel connecting at least two economic centers and costing more than US$50 million.

A well-thought-out theory of change could help corridor projects succeed, while the potential benefits of private-sector involvement have not been realized.

A country with initial conditions of being smaller, flatter, less developed and coastal could experience a higher likelihood of wider economic benefits from a transport corridor project.