



MEASURING AND ENHANCING MOBILITY IN DAKAR, SENEGAL

What are the effects of the BRT and TER on land value, relocation, and access to services, jobs and markets?

Proposed Elements of the Pilot Data System

CONGESTION:

Waze; Google Maps; traffic detecting devices

AIR QUALITY:

Daily measures of air quality index (AQI) from 6 stations

HOUSING PRICES:

Land cadaster; real estate agencies; satellite imagery

RELOCATION:

Household survey data; mobile phone data

ROAD SAFETY:

Police data

PUBLIC TRANSIT:

Household surveys; satisfaction surveys; smartcard data

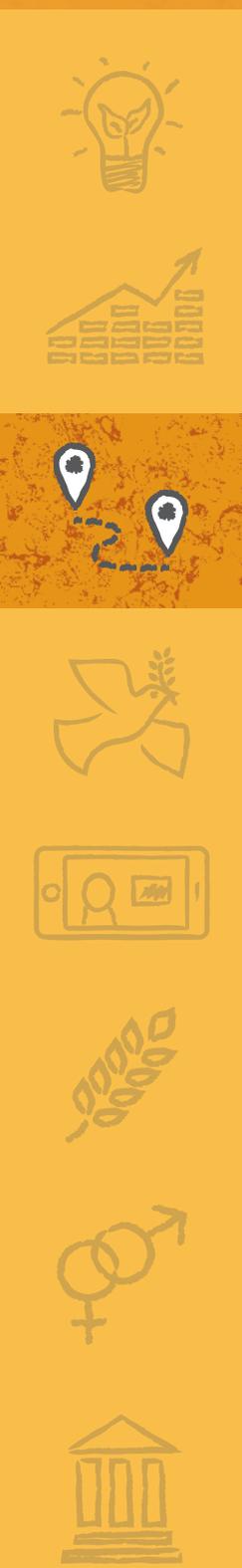
MOBILITY AND ACCESSIBILITY:

Household survey data; mobile phone data



Context

Lack of connectivity in African cities is an important factor constraining the inclusion of the poor in the growth process. Geographic disconnect and inefficient, low-capacity public transport negatively affect the poor, cutting them off from market opportunities. Improving urban mobility in Dakar is crucial for the development of the Senegalese economy, and a priority for the Government of Senegal. Within an area of 550 km², there were 3.5 million people in 2017—expected to rise to 5 million in 2030—representing 23% of the country's population and 50% of the urban population. To help promote mobility among this vast population, two flagship transportation projects are being



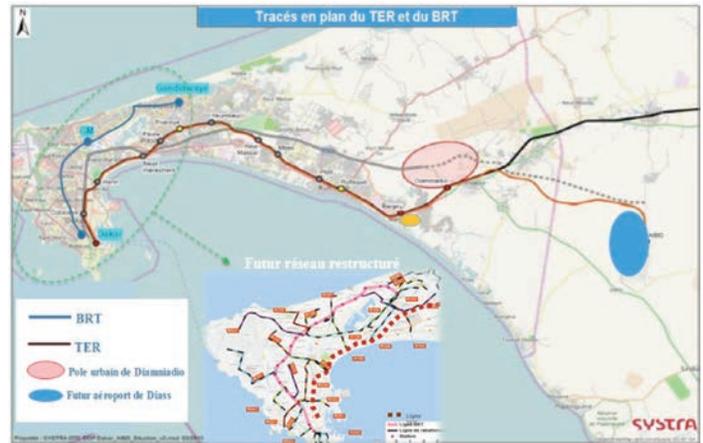
built: i) a modern bus transport system with high level of service (BRT) linking the city center to the north of the city and ii) a regional express train (TER) linking the city center to the south of the city. Construction of the TER began in 2017. Construction of the BRT will begin in 2019 and include the integration of existing feeder bus lines into the new system.

Such large infrastructure projects can have both positive and negative effects. Potential positive effects are important to measure to ensure full benefits are being captured. Yet, it is just as important to study negative consequences in the form of population displacement and changes in housing prices that negatively affect lower income individuals.

Impact Evaluation Research

This impact evaluation (IE) aims to conduct a systematic analysis of how these two large-scale, efficient mass transit systems influence environmental, mobility, and economic outcomes in Dakar. To be able to study the impacts on a wide variety of indicators, the research team, in collaboration with the Executive Council of Urban Transport in Dakar (CETUD), is building a pilot data system. The data system includes existing data that is already being collected (data on air quality and housing prices), leverages new types of data (mobile phone data and smartcard data), and combines this with traditional household surveys.

In terms of research methods, a difference-in-differences design is used to understand the impact of the BRT and the TER. Using both traditional survey data and high frequency data, this IE compares changes in outcomes over time for areas or individuals located near newly opened bus stops and train stations to changes in outcomes for areas or individuals unaffected and/or farther away. Using this research method, we plan to causally estimate the impact of the BRT and TER on land value, relocation, and access to services, jobs and markets. The pilot data system will track an even larger number of outcomes, including individual mobility, pollution, traffic, housing prices, neighborhood socioeconomic composition, crashes, and fatalities from road traffic injuries.



Policy Relevance

Given that the two projects being evaluated are flagship projects of the country's 5-year plan, the impact evaluation will be critical for government agencies to understand the effect of these large investments and more importantly, to provide evidence on how these investments can be further leveraged and scaled up in the coming years to increase their impact. Relatedly, as fast-growing African cities are considering new mass transit systems such as BRT or rail-based systems to tackle traffic and congestion challenges, this study gives policy makers actionable evidence on the impacts that can be expected from implementation of such infrastructure investments and how to capitalize on them to achieve even better development outcomes.

The pilot data system that will be developed for this project will allow for a systematic and continuous analysis of the impact of large-scale transport infrastructure. The pilot data system will remain available for use by government agencies for evidence-informed policy making and planning in the years to come. It will also act as a model for how data can be integrated and applied by policy makers in other countries to achieve better results.

For more information email dimettransport@worldbank.org or visit www.worldbank.org/en/research/dime/brief/transport



The ieConnect for Impact program links project teams with researchers to develop rigorous and innovative impact evaluations that both substantially improve the evidence-base for policy making and induce global shifts in transport policy. The ieConnect program is a collaboration between the World Bank's Development Impact Evaluation (DIME) group in the Development Research Group and the Transport Global Practice (TR GP). This program is part of the Impact Evaluation to Development Impact (i2i) multi-donor trust fund and is funded with UK aid from the UK government (DFID) and by the European Union (EU).