

IMPACT EVALUATION OF THE TRANSPORT SECTOR IMPROVEMENT PROJECT IN ADDIS ABABA



What is the impact on road safety outcomes of upgraded corridor and intersection design and other intelligent transportation system improvements?

Transport Systems Improvement Project (TRANSIP)

LOCATION:

Addis Ababa, Ethiopia

IMPLEMENTING AGENCIES:

- Addis Ababa Road and Transport Bureau
- Federal Transport Authority
- Addis Ababa Traffic Police Department
- Addis Ababa Road Traffic Management Agency

PROJECT DEVELOPMENT OBJECTIVE:

Improve mobility and road safety in Addis Ababa and countrywide.

INTERVENTION COMPONENTS:

- Upgrading 5 corridors and more than 250 intersections in Addis Ababa under a complete street design concept
- Use of smart radios by traffic police officers

Context

Ethiopia is entering a period of rapid urbanization, and its capital city, Addis Ababa, is experiencing significant road safety issues and traffic congestion. The problem is attributed to inadequate planning for, poor management of, and weak compliance with land-use and transport measures. The integration of land use and transportation infrastructure is insufficient, and manpower resources to plan for them are limited. Development, delivery, and management of transport infrastructure and services are severely challenged as a result. Travel in the city has become increasingly risky, especially for pedestrians, who make up 42% of commuters and 80% of total road traffic deaths. The risk is compounded by inadequate and inappropriate facilities and infrastructure and the lack of protected pedestrians crossings, both at mid-blocks and at intersections. The road fatality rate in Addis Ababa is 25.3 per 100,000 people each year, according to the World Health Organization; this is higher than the world's average of 17.4. The total road crash deaths reported in 2017 alone is 477, and the numbers are on the rise.

To address these problems, the Government of Ethiopia and the World Bank are implementing the Transport Systems Improvement Project (TRANSIP) to improve mobility in Addis Ababa and road safety countrywide. Among other objectives, the project aims to upgrade the existing traffic signal and control systems, improve the conditions on selected streets for pedestrians, and establish an "intelligent transportation system."

In November 2017, TRANSIP was selected to receive support from the ieConnect for Impact initiative to conduct an impact evaluation (IE). This initiative works with selected World Bank transport projects and to develop a rigorous, research-oriented evaluation of transport interventions. In August 2018, this activity also received the support from a Global Road Safety Facility grant, given its focus on road safety. The IE will provide a rich set of evidence on road safety in Ethiopia, exploring

two of the key components of TRANSIP: the upgrade of intersections and the deployment of smart “radios” to traffic police officials.

Impact Evaluation Research

This IE focuses on two key components that contribute to poor road safety conditions and traffic congestion: (i) unsuitable road safety infrastructure for pedestrians and drivers and (ii) poorenforcement of traffic rules. Both these components are addressed by TRANSIP. Safer roads and intersections have become a priority in urban transport policy in Addis Ababa after pop-up intersection redesigns have been positively received by the population (Photo a).

The first component of the IE seeks to measure the impact of the upgrade and redesign of street and road infrastructure to make them more efficient and safer for drivers and pedestrians. The evaluation design relies on data from observation and analysis of video footage. It will allow us to calculate road safety and road traffic outcomes before (baseline) and after (end line) the upgrades at 158 intersections on 5 corridors. A pilot, to be completed in 2020 on a sample of roughly 40 intersections in Addis Ababa, will generate early results and will inform the TRANSIP design.

The focus of the evaluation will be on road safety outcomes that measure the likelihood of future collisions, such as near collisions (vehicle-to-vehicle or vehicle-to-pedestrian), red light violations, pedestrian jaywalking, and speeding. A visualization of pedestrian jaywalking behavior can be seen in Photo b.***

This IE will rely on a video-based solution that applies computer vision and artificial intelligence to automate the measurement of road safety outcomes.

The scale of this initiative requires rolling out the upgrades over time. The implementing agencies will divide the city into a set of geographical



Photo a. Pop-up intersection redesign in Addis Ababa, Ethiopia
(Source: Global Designing Cities Initiative)

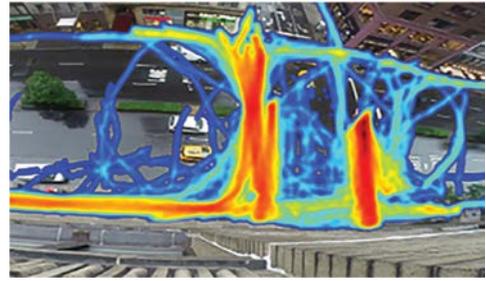


Photo b. Heatmap of pedestrian jaywalking behavior
(Source: BriskAdvantage)

zones and proceed with intersection upgrades one zone at a time. This ensures that the timing of the intersection upgrades across the city is random, which is critical for the identification strategy.

The second component of the IE is to measure the impact of the adoption of smart radios by the traffic police officers. The smart radios are expected to facilitate traffic enforcement by enabling digital incident and violation reporting, leading to improved road safety outcomes. The IE is based on the piloting of smart radio adoption by a sample of 500 police officers. The outcomes are road safety indicators calculated through the video-based approach for estimating outcome variables.

Policy Relevance

The IE of the proposed components it helps stakeholders understand

- The causes of road safety risks at key intersections and along 5 selected transit corridors and more than 250 intersections in Addis Ababa;
- The most effective interventions that reduce road safety risks and improve pedestrian and traffic flow; and
- How to improve police traffic management in Addis Ababa through the use of smart radios.

The research findings should be instrumental in scaling up these solutions within the project and across future interventions in Addis Ababa or other cities in Ethiopia. The findings will be useful both for deciding *whether* interventions should be scaled up and *how* they should best be scaled up.

For more information email dimetransport@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 and the Transport Global Practice. 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 and by the European Union.