

## Evaluating Innovative Financing Mechanisms for the California High-Speed Rail Project

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Funding for large-scale infrastructure projects often involves partnerships with public entities at the local, regional, and/or national levels. However, unforeseen challenges thwart full-fledged financing of projects that use public funds. This is because public funds are often politically invested, temporal, tax-dependent, and sensitive to the public agency's economic health. Large-scale projects like high-speed rail (HSR) require funding from various avenues besides public monies. Although HSR serves the general public's mobility needs, any funds (whether state or federal) flowing from the public exchequer usually undergo strict review and scrutiny. Funds from public agencies are always limited, making such traditional financing mechanisms unsustainable with reference to HSR projects' long-term operational and maintenance cost needs—on top of the initial cost involved in construction. Therefore, any sustainable means of financing HSR projects is always welcome.

This research presents an alternate revenue generation mechanism that could be sustainable for financing HSR construction, operation, and maintenance. The methodology involves identifying key HSR stations, which, after development and improvement, could significantly add value to businesses and promote real estate growth. Any form of real estate taxes levied on properties surrounding such stations could substantially support the HSR project's funding needs. However, research shows that not every HSR station promotes increased economic activity, and impacts vary based on the station's city. Therefore, it will be useful to know which stations could be subject to development and improvement to cause increased economic activity in their surroundings for both revenue generation and growth in economic potential.

### Study Methods

In this research, a bi-objective optimization problem is posed in conjunction with a Pareto-optimal front framework to identify those key stations. The optimization

problem seeks to identify one or more HSR stations that have the largest increase in revenue generated from tax collected from the real estate properties surrounding the station and the largest increase in the station's potential accessibility value. However, this might not be possible: i.e., a station could have the largest potential accessibility increase but its revenue generation could lag. For a better understanding of the interaction between the potential accessibility and revenue generation, formulations are developed for each of the two objectives.

This research presents an alternate revenue generation mechanism that could be sustainable for financing high-speed rail (HSR) construction, operation, and maintenance.

## Findings

With 28 proposed California HSR stations used as examples, the authors observed that the four proposed HSR stations in Fullerton, Millbrae-SFO, San Francisco Transbay Terminal, and San Diego would be excellent candidates for development. Their development could increase the economic vitality of surrounding businesses. These four stations are located at some of California's densest employment hubs and would become well-connected once HSR becomes fully operational in the state. Out of the four stations proposed, the Millbrae-SFO and San Francisco Transbay Terminal stations are located spatially in vicinity to each other.

The proposed Millbrae station already serves the Caltrain and Bay Area Rapid Transit (BART) modes near San Francisco International Airport (SFO). With enhanced transit connectivity provided by the HSR station at Millbrae-SFO, it will encourage surrounding station area development and promote economic growth in conjunction with other existing transportation modes. Currently, a draft environmental document is underway for determining the Millbrae-SFO station location and alignment.

The proposed HSR station in San Francisco is the Salesforce Transit Center (STC), which will serve eleven transportation systems and has been environmentally cleared by the Transbay Joint Powers Authority (TJPA).

Fullerton's proposed station is currently under evaluation

on the Los Angeles to Anaheim project section by the HSR authorities and the proposed HSR station of San Diego is to be located close to the San Diego International Terminus. Thus, the station will facilitate access to the air

transportation mode once HSR becomes operational.

## Policy/Practice Recommendations

The research findings summarized above could serve as valuable information for California HSR authorities, prompting them to focus on developing the four aforementioned vital stations that could generate an alternate funding source for HSR project funding when such efforts are facing challenges.

## About the Principal Investigator

Dr. Shailesh Chandra is an associate professor in the Department of Civil Engineering and Construction Engineering Management at California State University, Long Beach (CSULB). He obtained his MS and PhD in civil engineering from Texas A&M University in 2009 and 2012, respectively. Dr. Chandra has more than twelve years of experience in transportation research focused on transport connectivity, transportation economics, accessibility, urban freight, and sustainability. He has been a principal investigator (PI) for several projects funded by various transportation agencies including the California Department of Transportation (Caltrans) and the United States Department of Transportation (USDOT).

## To Learn More

For more details about the study, download the full report at [transweb.sjsu.edu/research/2047](https://transweb.sjsu.edu/research/2047)



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