

Modal Shift and High-Speed Rail: A Review of the Current Literature

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MTI Project 1223

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As California prepares to build its high-speed rail (HSR) system, much of the future success of that system depends on its

Essentially, the recent literature affirms that HSR has resulted in dramatic or significant mode shifts where it has been systematically evaluated.

ability to effect “modal shift” from other forms of transportation. Moving passengers from existing (and perhaps future) air, bus, and automobile options to HSR is generically referred to as “mode shifting.” This project consists of a review of existing scholarly research on HSR and modal shift – with an emphasis on the most recent findings. Using the most recent research on the subject, this project addresses the following questions:

- How do researchers identify and measure modal shift?
- How much modal shift among air, auto, and other modes is believed to be caused by the availability of new HSR systems and routes?
- How much modal shift has been documented by HSR systems in specific countries that have more mature HSR systems?
- Which factors have been shown to affect size and quality of mode shift?

Study Methods

The study is based entirely on a review of scholarly research with direct relevance to modal shift. A broad search was conducted using transportation-specific search engines, such as Transport Research International Documentation (TRID), as well as broader databases, such as Google Scholar and Academic Search Premier. The search was focused on relatively recent studies that yielded findings based on pre- and post-HSR data. These studies address the actual performance of HSR systems around the world and their ability to compete with other modes, particularly air, automobile, and bus.

Findings

Although the compiled research reflects a great deal of variety in terms of the selected HSR systems, time frames, and research strategies, a great deal of scholarly consensus has emerged about the effectiveness of HSR as a competitor with other modes for passengers. As stated in the report, “*the bulk of available evidence points to the conclusion that, under many circumstances, HSR presents a significant competitive challenge to other modes and often provides noteworthy advantages.*”

The study also identifies some of the conditions under which HSR is most effective at competing with other modes:

- Travel time is the prime determinant of both demand for HSR and modal shift to HSR.
- Travel time to get to and from the station and/or airport, as well as the quality of the travel time (e.g., number of transfers required), are also important.
- Lower travel costs associated with HSR often make it more competitive.

Essentially, when HSR is the faster alternative—particularly with respect to total time from point of origin to final destination—it typically attracts a large, if not majority share of travelers on a given route. Lower total travel costs for HSR can increase this advantage. These outcomes are documented in many different settings that offer multiple modes, although, to date, most of the research has focused on HSR competition with air transportation. Evidence also points to the ability of HSR systems to displace use of automobiles.

Although it does not offer new data or analysis, the study finds that the planned California HSR system seems to offer many of the key variables associated with the ability to capture market share.

About the Authors

Dr. Peter Haas has been a faculty member in the Master of Science in Transportation (MSTM) program at the Mineta Transportation Institute (MTI) at San Jose State University since 1999 and was appointed Education Director in October 2001. He earned a Ph.D. in political science (Public Policy and Public Administration) from the University of North Carolina at Chapel Hill in 1985. As a Research Associate for MTI, Dr. Haas has authored numerous reports and other publications covering transportation, including topics relevant to high-speed rail workforce development and station planning, as well as transportation finance and tax initiatives. Haas is also co-author of the text *Applied Policy Research: Concepts and Cases*.

To Learn More

For more details about the study, download the full report at transweb.sjsu.edu/project/1223.html