

UTC Project Information	
Project Title	Developing Seamless Connections in the Urban Transit Network: A Look Toward High Speed Rail Interconnectivity
University	University of Nevada, Las Vegas Mineta National Transit Research Consortium
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Funding Source(s) and Amounts Provided (by each agency or organization)	Research and Innovative Technology Administration University Transportation Centers Program (\$81,280) China Department of Education (\$13,600) ENTPE, France (\$9,868) HDR Inc. (\$5,000)
Total Project Cost	\$109,748
Agency ID or Contract Number	DTRT12-G-UTC21
Start and End Dates	January 2012 – July 2014
Brief Description of Research Project	<p>In the past, U.S. studies on high-speed rail (HSR) have focused primarily on the economic implications of high-speed rail development. Recently, however, studies have begun evaluating multimodal connectivity of HSR stations. The ways in which different modes are connected to HSR stations influences the ridership of HSR. As the development of the U.S. HSR system has reached the stage of design and construction, guidelines on multimodal connectivity are necessary to maximize that ridership.</p> <p>The objective of this study was to quantify multimodal connectivity of HSR stations and its impact on ridership in four countries where HSR has been established, setting the basis for future rail interconnectivity. In this study, multimodal connectivity is measured by the number of different modes of transportation connected to HSR stations, the number of installed arrival and departure facilities for each mode, the transfer time from connecting modes to boarding platforms at HSR stations, and the arrival time intervals of public transportation modes. To achieve this objective, data were collected from HSR systems of</p>

	<p>France, Spain, Japan and China. Various characteristics of the connecting modes were observed and compared. The relationship between ridership and the characteristics of multimodal connectivity was identified using regression models developed in this study.</p> <p>It was observed from the analysis that the multimodal connectivity at HSR stations in various countries presents a variety of profiles. For example, HSR stations in China connect with more bus lines than those in other countries. Relatively, there are more bus stops/terminals provided in France. Transfer times in Japan and China are significantly longer than those in France and Spain. The average bus arrival interval in France is longest, at more than double that in China.</p> <p>All the connectivity variables considered in this study influence ridership in these four countries in various ways. On the whole, bus, subway, and regional railroad service influence ridership significantly. For instance, the more bus services connected to the station, the higher the ridership. This trend is apparent in three of the four countries, France being the exception. Also, subway, light rail, and traditional rail are modes of high-capacity transportation. Their connection to HSR stations always implies high ridership for high-speed rail. The number of facilities also shows significant impacts on HSR ridership. For instance, the more bus and subway stops, and the more bicycle parking and taxi stands, the higher the ridership. Transfer time also has a significant influence.</p> <p>These findings have important implications for the proposed California and Nevada HSR stations. Accommodations for arrival on foot or by bicycle are recommended. More issues on transfer time at HSR stations in the metropolitan areas in California are elaborated upon. Also discussed are the unique needs of visitors to Las Vegas and their implications for HSR design.</p>
<p>Describe Implementation of Research Outcomes (or why not implemented)</p>	<p>Teng, Harry, T. Toughrai, T. Yu, R. Ozawa and B. Hu. "Developing Seamless Connections in the Urban Transit Network: A Look Toward High-Speed Rail Interconnectivity." CD-ROM for American Railway Engineering and Maintenance-of-Way Association Annual Conference, Chicago, IL, September 28 – October 1, 2014.</p> <p>Teng, Harry. "High Speed Rail Station Multimodal Connectivity in France." Presentation at the 20th Annual Fall Transportation Conference, Las Vegas, NV, October 10, 2012.</p>

	<p>Teng, Harry. "Developing Seamless Connections in the Urban Transit Network: A Look Toward High Speed Rail Interconnectivity. Presentation at the American Railway Engineering and Maintenance-of-Way Association (AERMA), Chicago, IL, September 28, 2014.</p>
<p>Place Any Photos Here</p>	<div> </div> <p>Platforms at Paris-Lyon Station</p>
<p>Impacts/Benefits of Implementation (actual, not anticipated)</p>	<p>Developing connected transportation systems at high speed rail stations, particularly incorporating bike and pedestrians facilities, will be given more consideration in high speed rail station planning and design.</p>
<p>Web Links</p> <ul style="list-style-type: none"> • Reports • Project Website 	<p>Final report (MNTRC Website): http://transweb.sjsu.edu/project/1148.html</p>