Getting up to speed: Assessing the usable knowledge from global HSR experience for the U.S.

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It’s now been 50 years since Japan launched the Shinkansen.
Japan’s HSR development was guided by an exclusive corridor strategy
Began by connecting megacities less than 350 miles apart with purpose built trains & tracks

Tokyo region now 32.5 million

Osaka region now 18.7 million
The U.S. played an important, though mostly unintentional, role in enabling Japan’s railway revolution.
Postwar occupation and pacification reoriented the aerospace industry to surface transportation.
Engineers transferred aerospace know-how to redesign high speed trains that set new records.

Inaugural run 1964
Inaugural flight 1967
Japan’s exclusive corridor strategy yielded passenger trains’ biggest commercial success in the 20th Century.
Shinkansen’s achievement was widely recognized, but the exclusive corridor’s infrastructure raised a high barrier to diffusion
U.K. & U.S. exposed the limits of building fast trains to run on existing tracks
America’s fast trains hardly ever attained their design speeds of >150 mph
French and German pursuit of HSR in 1980s yielded strategic innovation: hybrid networks

- Exclusive trunk lines built where rail was most congested
- New capacity used to enhance freight fluidity while speeding passenger travel
- Shared tracks to access origin and destination of most routes
Europe’s hybrid networks could be incrementally expanded

French President Mitterrand drives a pre-inaugural TGV in 1981.


President Mitterrand and Queen Elizabeth inaugurate the Eurostar in 1994.
As of 2014, Europe had 4,568 miles of HSR, representing 32% of the world’s total.
Europe’s hybrid networks allowed HSR to successfully serve a much less densely populated territory than Japan.
Korea and Taiwan advanced HSR in Asia by following Japan’s exclusive corridor strategy within their borders.
China took HSR to a new level by building a 9,470 mile national network, bringing 66% of the world’s HSR to Asia.
China’s leadership made a national HSR network a national priority

Prime Minister Wen Jiabao aboard inaugural Beijing – Shanghai HSR in 2011
Counting generously, North America had 2% of the world’s 14,263 miles of HSR in 2014.
While the world was inventing multiple models for HSR, pursuit of passenger trains’ potential slowed down in the U.S.

The significant railroad innovation that occurred in the U.S. made it harder to advance intercity passenger rail.
Private ownership of almost all U.S. rail infrastructure yields a structural difference for HSR planning and development.
U.S. innovation was motivated by the near death experience of many Northeast and Midwest railroads in the 1970s.
20th century rail bankruptcies spurred disconnected dynamics of freight rail innovation and passenger rail preservation.

"It all started when my train of thought was deregulated...."
Freight railroads no longer had to move everything, focusing on high volume profitable market niches.
Infrastructure supporting long, heavy freight trains and HSR has less and less in common.
Can U.S. freight and global passenger rail innovations of the past half century be reconciled?
On transportation demand, the U.S. demographics have been converging with Asia and Europe
Demographics, energy economics and environmental trends point to less driving and more train travel in the U.S., as in Europe and affluent Asian cities.

Driver’s license attainment declining 1983-2008

- 19% 17 year olds
- 12% 19 year olds
- 10% 20 somethings
- 5% 30 somethings

Source: University of Michigan Transportation Research Institute, Dec 2011
U.S. has moved fast in following some past mobility breakthroughs.
Simultaneous engagement by both federal and state governments is a prerequisite for transportation policy learning. This began in 2008.
Three lessons can help U.S. advance HSR

1. There is more than one strategy to follow in designing a successful deployment of HSR.

2. All levels of government have to be on board the same train for HSR to succeed.

3. Leadership is an essential element in bringing the public and private sector together to deploy HSR.
Some global experience could be immediately applicable; other knowledge will need to be adapted; and some know-how will be unique to North America.
Lesson 1: The original HSR design has been extended to work in places with few or no mega-cities and limited infrastructure funds/space for exclusive corridors.
Europe has made a blended HSR network succeed.
California is now adapting the blended HSR network design to North America.
Lesson 2: Leadership enables multiple levels of government to work together in advancing HSR.

A leader is one who knows the way, goes the way, and shows the way

~John Maxwell
One state usually leads America to the launch of a transportation breakthrough.
Breakthroughs diffuse through inter-governmental partnership which are then formalized through federal legislation.
Lesson #3 – The appetite for HSR planning and financing will grow when its contribution to prosperity becomes clearer.

“When you’re helpful, you’re irresistible”

Michael Yoder
Founder, LinkedUp Grand Rapids
Americans have consistently sought three things from transportation
Cars promised the keys to a good life during the 20th century American dream.
Jet aircraft offered Americans the fastest way to travel.
Low cost airlines, and more recently bus companies, provide the good deals that make mobility more accessible.
HSR has a proven record delivering these desired attributes during half a century of global operation.
Climate and energy volatility will keep reminding Americans that today’s mobility carries growing risk.
If HSR development is seen as a safe(r) way to make money because it provides mobility with less risk, then planning and financing will accelerate
These lessons could speed up the countdown to America’s future adoption of HSR