William W. Hay Railroad Engineering Seminar

“The Development of High Speed Rail in China and its Economic and Social Benefits”

Lei Nie
Professor and Dean
School of Traffic and Transportation in Beijing Jiaotong University

Date: Friday, May 29, 2015  Time: Seminar Begins 2:00 pm
Location: Newmark Lab, Yeh Center, Room 2311
University of Illinois at Urbana-Champaign

Sponsored by
The development of High Speed Railway in China and Its Economic and social Benefits

Prof. Lei NIE
School of Traffic and Transportation
Beijing Jiaotong University
2015-05
OUTLINE

- Background of the development of HSR
- High speed railway network in China
- Operation performance of HSR in China
- Contribution of HSR to China’s economy
- Influence of HSR on the development of society
Railway Network

Year | Mileage
--- | ---
1949 | 2.2
1950 | 4.1
1955 | 4.9
1970 | 5.5
1975 | 5.8
1980 | 6.3
1985 | 6.9
1990 | 7.4
1995 | 7.54
2000 | 7.8
2004 | 7.97
2006 | 7.71
2008 | 8.55
2010 | 9.12
2011 | 9.32
2012 | 9.76
2013 | 10.31

Table:

<table>
<thead>
<tr>
<th>Year</th>
<th>2010年</th>
<th>2011年</th>
<th>2012年</th>
<th>2013年</th>
</tr>
</thead>
<tbody>
<tr>
<td>营业里程</td>
<td>91179</td>
<td>93250</td>
<td>97626</td>
<td>103144</td>
</tr>
<tr>
<td>复线里程</td>
<td>37487</td>
<td>39500</td>
<td>43749</td>
<td>48287</td>
</tr>
<tr>
<td>电气化里程</td>
<td>42464</td>
<td>46064</td>
<td>51029</td>
<td>55811</td>
</tr>
</tbody>
</table>
The busiest railway with the most efficient in the world (2005)

- In the world: 6% (route length), 25% (converted turnover)

Traffic density: 35.51 million converted tk/km

- Passenger: 606.2 billion p/km
- Freight: 2.072 trillion t/k
The development of Chinese Transport System

1980—2003
- Highway: 883.3 thou km → 1.81 mn km
- Air: 195.3 thou km → 1.7495 mn km
- Railway: 53,300 km → 73,000 km

GDP

Hundred billion RMB

Graph showing the development of Chinese Transport System from 1980 to 2003.
Difficult time for Chinese railway

- **capital construction investments**
- Railway passenger, freight volume growth
- Hundred million RMB
- Hundred million tons
- Hundred million people

- Capital construction investments grew significantly from 1980 to 2003.
- Freight volume grew from 1980 to 2008.
- Capital construction investments reached 8 billion RMB in 2003.

Graph shows the growth of capital construction investments, railway passenger volume, and freight volume from 1978 to 2008.
Railway Transport
(11\textsuperscript{th} Five Year 2006-2010)

- Wood: 85%  
- Crude oil: 85%  
- Coal: 60%  
- Steel etc.: 80%  

Da-Qin Railway line, 653km
- Coal: More than 400 mn. ton/year
## Railway Network Density

<table>
<thead>
<tr>
<th>Country</th>
<th>Length /10th km</th>
<th>Network density /per mn km²</th>
<th>Chinese network density compared with other countries %</th>
<th>In terms of population compared with other countries %</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>7.8</td>
<td>81.25</td>
<td></td>
<td>6cm/person</td>
<td>2007</td>
</tr>
<tr>
<td>USA</td>
<td>22.7</td>
<td>235.44</td>
<td>35%</td>
<td>7%</td>
<td>2006</td>
</tr>
<tr>
<td>France</td>
<td>2.9</td>
<td>436.96</td>
<td>19%</td>
<td>12%</td>
<td>2007</td>
</tr>
<tr>
<td>Japan</td>
<td>2.0</td>
<td>530.65</td>
<td>15%</td>
<td>28%</td>
<td>2006</td>
</tr>
<tr>
<td>Germany</td>
<td>3.8</td>
<td>1064.36</td>
<td>8%</td>
<td>14%</td>
<td>2007</td>
</tr>
</tbody>
</table>
Shortage of railway capacity

- Year 2008, everyday: 2.76 million seats can offer, actually 3.72 million persons
- Only about 35% of freight transport demand satisfied

Railway Station (Spring Festival)
Six large scale Speed Increasing

- **First**: 04-01-1997
- **Second**: 10-01-1998
- **Third**: 10-21-2000
- **Fourth**: 10-21-2001
- **Fifth**: 04-18-2004
- **Sixth**: 01-18-2007
Special timetable

Good year is coming…….
OUTLINE

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相关概念
—
客运专线

- 中华人民共和国国家标准《铁路工程基本术语标准》：专供旅客列车行驶的路网铁路。
- 铁道部《中长期铁路网规划》中将我国客运专线的速度目标值确定为200km/h及以上。

客运专线与高速铁路的关系

<table>
<thead>
<tr>
<th>区分方式</th>
<th>高速铁路</th>
<th>客运专线</th>
</tr>
</thead>
<tbody>
<tr>
<td>速度(主要开行旅客列车)</td>
<td>300km/h及以上</td>
<td>200km/h及以上</td>
</tr>
<tr>
<td>运输组织模式</td>
<td></td>
<td></td>
</tr>
<tr>
<td>使用情况</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- 我国建设的主要客运专线速度目标值为300km/h及以上，基本构成我国高速铁路网，有些线路虽然叫客运专线，但规划为客货混行线路，如石太客运专线。
- 客运专线在国外不常使用，一般直接用高速铁路，但有一些铁路为货运专线。

相关线路

- 北疆铁路复线
- 南疆铁路复线
- 兰青复线
- 青藏铁路青格段复线
- 包西通道
- 新建北京南站、北京至北京西站地下直径线
- 精伊霍铁路
- 中吉乌铁路
- 奎屯至北屯铁路
- 临河至策克铁路
- 太原至中卫（银川）铁路
- 至平凉铁路西安
- 兰州至重庆铁路
- 隆昌至黄桶铁路
- 青藏铁路延伸线
- 大理至瑞丽铁路
- 玉溪至磨憨铁路
- 昆明至河口铁路
- 哈尔滨-大连
- 北京-秦皇岛
- 石家庄-太原
- 淄博-青岛
- 兰州-重庆
- 兰州-成都
- 兰州-上海
- 兰州-成都
- 兰州-广州
- 上海-杭州
- 上海-福州
- 上海-厦门
- 昆明-沾益-六盘水复线
- 湘桂复线
- 广珠铁路、广深四线
- Harbin-Dalian
- Beijing-Qinghuangdao
- Shijiazhuang-Taiyuan
- Jinan-Qingdao
- Lanzhou-Xuzhou
- Beijing-Shanghai
- Shanghai-Wuhan-Chengdu
- Beijing-Guangzhou
- Ningbo-Xiamen-Shenzhen
- Shanghai-Kunming

Legend
- Conventional line
- PDL
- Planed conventional
- Under research
Long-term planning of HSR network

- According to a blueprint by the Ministry of Railway, China will build **16,000** km of high-speed railway by 2020
- **Eight** long distance lines and more than **10** Intercity passenger railway lines (for urban clusters)
- The high speed network will cover **70%** of the country’s key cities and **90%** of the population nationwide
Total length of the 8 long distance high speed railway is about 12,000 km.

- Beijing-Hong Kong: 2230km
- Beijing-Shanghai: 1318km
- Shanghai-Chengdu: 1900km
- Beijing-Haerbin: 1860km
- Shanghai-Shenzhen: 1600km
- Hangzhou-Changsha: 880km
- Xuzhou-Lanzhou: 1400km
- Qingdao-Taiyuan: 770km
4000 km Intercity passenger railway lines (2008)

Pan Pearl River Delta Area
Urban Transit System
(by 2012-12-31-)

- Red circles: Cities with operational urban transit systems (17 cities)
- Green circles: Cities with urban transit systems under construction (12 cities)
- Gray circles: Cities with urban transit systems in planning (24 cities)
Achievements
– 2014, over 16,000 km high-speed railway in operation
– 14.3% in total length
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## Ticket price for different transport modes
(According to original price and exchange rate on Sept. 2012)

<table>
<thead>
<tr>
<th>Mode</th>
<th>Travel time(h)</th>
<th>Price(¥)</th>
<th>Rate(¥/km)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Beijing-Shanghai 1318km</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Road</td>
<td>~13.6</td>
<td>~340</td>
<td></td>
</tr>
<tr>
<td>C-Railway</td>
<td>~15.8</td>
<td>179/306 (Hard seat/sleeper)</td>
<td></td>
</tr>
<tr>
<td>Air</td>
<td>~5</td>
<td>~1280 (Airport fee inc)</td>
<td></td>
</tr>
<tr>
<td>HSL-G</td>
<td>~5.7</td>
<td>555/935 (2nd/1st)</td>
<td>0.42/0.71</td>
</tr>
<tr>
<td>HSL-D</td>
<td>~9.8</td>
<td>410/650 (2nd/1st)</td>
<td>0.31/0.49</td>
</tr>
<tr>
<td><strong>Tokyo-Hakata 1175km</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air</td>
<td>~3</td>
<td>~2988 (Tax inc)</td>
<td></td>
</tr>
<tr>
<td>Shinkansen</td>
<td>~5.7</td>
<td>~1718/2371 (2nd/1st)</td>
<td>1.46/2.02</td>
</tr>
<tr>
<td><strong>Paris-Lyon 409km</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air</td>
<td>~2.4</td>
<td>~830 (Book 1.5m before)-2530 (Insurance inc)</td>
<td>1.38/2.46</td>
</tr>
<tr>
<td>TGV</td>
<td>~2.4</td>
<td>~565/1007 (Second/First)</td>
<td></td>
</tr>
</tbody>
</table>
## Ticket Price Comparison

<table>
<thead>
<tr>
<th>Route</th>
<th>Distance (km)</th>
<th>Price (Second/First)</th>
<th>Monthly Salary [MS]</th>
<th>Price to MS (%) (Second/First)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beijing-Shanghai</td>
<td>1153</td>
<td>495/830 (¥)</td>
<td>1929 (¥)</td>
<td>26/43</td>
</tr>
<tr>
<td>Tokyo-Hakata</td>
<td>1175</td>
<td>2.1/2.9 (10th JPY)</td>
<td>20.6 (10th JPY)</td>
<td>10/14</td>
</tr>
<tr>
<td>Paris-Lyon</td>
<td>1153</td>
<td>495/830 (¥)</td>
<td>1929 (¥)</td>
<td>26/43</td>
</tr>
</tbody>
</table>
Passenger flow volume

Spain: Madrid-Seville (471km)

- Beijing-Tianjin (120km): more than 21 million/year
- Wuhan-Guangzhou (1068km): more than 36 millions in 2012
- Shanghai-Nanjing (301km): more than 60 millions in 2011
- Shanghai-Hangzhou (202km): more than 30 millions in 2011
- Beijing-Shanghai (1318km): 74 million in second year (2012-2013)
Passenger flow volume

- Year 2014, 2600 EMU train/day
- Rapid increase of EMU train passenger
  - Year 2013, 670 million passengers by EMU train
  - Year 2014, 866 million passengers by EMU train, amount to 37.5% in total
  - Each year increased by 30%
Passenger flow volume of Railway

Persons/10000

<table>
<thead>
<tr>
<th>Year</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>167609</td>
<td>186226</td>
<td>189337</td>
<td>210597</td>
<td>235704</td>
</tr>
</tbody>
</table>

P.km/100million

<table>
<thead>
<tr>
<th>Year</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>8762.18</td>
<td>9612.29</td>
<td>9812.33</td>
<td>10595.62</td>
<td>11604.75</td>
</tr>
</tbody>
</table>
Revenue of Chinese HSR

- **Beijing-Shanghai high speed railway:**
  - First year: 11 billion RMB
  - Second year: 17 billion RMB
  - Third year: 25 billion RMB

- Without considering depreciation, four HSRs revenue and expenditure can be balanced
  - **Beijing-Tianjing:** 120 km, 2008-8-1
  - **Beijing-Nanjing:** 301 km, 2010-7-1
  - **Beijing-Shanghai:** 1318 km, 2011-6-30
  - **Shanghai-Hangzhou:** 202 km, 2010-10-26

From: Huaxia Times

From: web information
Investment of Chinese HSR

- **Beijing-Shanghai**: 1318km, 350km/h, 217.6 billion RMB

### Top ten shareholder

1. China Railway Investment Corp: 54%
2. Ping An Asset: 13%
3. 8%
4. 6%
5. 4%
6. 4%
7. 3%
8. 2%
9. 2%
10. 1%

- 中国铁路建设投资公司
- 平安资产管理有限责任公司
- 全国社会保障基金理事会
- 上海申铁投资有限公司
- 中银集团投资
- 江苏交通控股有限公司
- 北京市基础设施投资有限公司
- 天津铁路建设投资控股（集团）有限公司
- 南京铁路建设投资有限责任公司
- 山东铁路建设投资有限公司
- 河北建设交通投资有限责任公司
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Time value saved by HSR

Beijing-Shanghai: 2013 Time Value

- $\pi_0 = \text{Saving Time} \times \text{Annual passengers} \times \text{Time value per person}$
- $\pi_0 = (14.7-5.9) \text{(h/person)} \times [83.9 \text{ (million persons)} \times 553 \text{(km)}/1318 \text{(km)}] \times \{74200 \text{(yuan/year)}/[251 \text{(day/year)} \times 8 \text{(h/day)}]\}$
- $\approx 11.5 \text{ (billion Yuan)}$

Time value saved by Beijing-Shijiazhuang HSR (218km)

<table>
<thead>
<tr>
<th>Speed (km/h)</th>
<th>T1(min)</th>
<th>T2(min)</th>
<th>$\Delta C$(h)</th>
<th>R(bil)</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>156</td>
<td>85</td>
<td>1.183</td>
<td>2.27</td>
</tr>
<tr>
<td>250</td>
<td>156</td>
<td>68</td>
<td>1.467</td>
<td>2.82</td>
</tr>
</tbody>
</table>

Source: Li Lele, Zhou Hu — Research on the Socioeconomic Indicator System of China's High-Speed Rail 《世界科技研究与发展》
Travel Circle from Beijing

- 2298km from Beijing to Hong Kong
- 8-10 hours

Time saving:
- Xiamen-Shenzhen: 11 h → 3.5 h
- Nancang-Fuzhou: 11 h → 3.5 h
- Guiyang-Guangzhou: 22 h → 4 h
- Nanning-Guangzhou: 12 h → 3 h
Tianjin: economy promoted by Beijing-Tianjin HSR

- Economy increased by **16.5%** in both 2008 and 2009, much more higher than the average growth rate of GDP in China
- Retail sales of social consumer goods **up 25.2%** in 2008, **21.5%** in 2009, the growth comes out on top in China
- 6 free museums and memorials, 800,000 out-of-town visitors from 2008 to the middle of 2009, in which **90%** from Beijing
- The revenue of theater grow **20%** after the opening of Beijing-Tianjin HSR
- The sales volume of traditional artware such as Clay figurine Zhang, Folk painting grow **50%**
## HSR fuel the economy growth of related industries (1/3)

<table>
<thead>
<tr>
<th>Rank</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry</td>
<td>non metal mining</td>
<td>nonmetal mineral Products</td>
<td>metal mining</td>
<td>metal smelting and rolling processing</td>
<td>petroleum and natural gas mining</td>
</tr>
<tr>
<td>pull coefficient</td>
<td>0.622</td>
<td>0.597</td>
<td>0.558</td>
<td>0.486</td>
<td>0.407</td>
</tr>
<tr>
<td>Pull economic amount/RMB (billion)</td>
<td>1214</td>
<td>1165</td>
<td>1088</td>
<td>948</td>
<td>793</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rank</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry</td>
<td>waste material</td>
<td>metal products</td>
<td>petroleum, coking and nuclear fuel processing</td>
<td>wood processing and furniture manufacturing</td>
<td>instrumentation and culture, office machinery manufacturing</td>
</tr>
<tr>
<td>pull coefficient</td>
<td>0.397</td>
<td>0.377</td>
<td>0.341</td>
<td>0.332</td>
<td>0.324</td>
</tr>
<tr>
<td>Pull economic amount/RMB (billion)</td>
<td>774</td>
<td>734</td>
<td>665</td>
<td>648</td>
<td>632</td>
</tr>
</tbody>
</table>

来源：杨正泽 王庆云——从城镇化视角看中国高速铁路发展 《交通运输系统工程与信息》
### HSR fuel the economy growth of related industries (2/3)

<table>
<thead>
<tr>
<th>Rank</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry</td>
<td>Information Transmission, Computer Service and Software</td>
<td>Electricity, heat production and supply</td>
<td>Electrical, machinery and equipment manufacturing</td>
<td>transportation and warehousing</td>
<td>Coal Mining and Processing</td>
</tr>
<tr>
<td>pull coefficient</td>
<td>0.292</td>
<td>0.262</td>
<td>0.24</td>
<td>0.231</td>
<td>0.227</td>
</tr>
<tr>
<td>Pull economic amount/RMB billion</td>
<td>570</td>
<td>512</td>
<td>469</td>
<td>451</td>
<td>443</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rank</th>
<th>16</th>
<th>17</th>
<th>18</th>
<th>19</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry</td>
<td>General, special equipment manufacturing</td>
<td>chemical</td>
<td>Tenancy and Business Services</td>
<td>water production and distribution</td>
<td>Polytechnical Services</td>
</tr>
<tr>
<td>pull coefficient</td>
<td>0.225</td>
<td>0.22</td>
<td>0.208</td>
<td>0.202</td>
<td>0.184</td>
</tr>
<tr>
<td>Pull economic amount/RMB billion</td>
<td>439</td>
<td>429</td>
<td>405</td>
<td>393</td>
<td>359</td>
</tr>
</tbody>
</table>
## HSR fuel the economy growth of related industries (3/3)

<table>
<thead>
<tr>
<th>Rank</th>
<th>21</th>
<th>22</th>
<th>23</th>
<th>24</th>
<th>25</th>
<th>26</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry</td>
<td>Finance and Insurance</td>
<td>wholesale and retail trade</td>
<td>Miscellaneous manufacturing</td>
<td>Paper printing and stationery manufacturing</td>
<td>Transportation equipment manufacturing</td>
<td>Communications, computers and other electronic equipment manufacturing</td>
</tr>
<tr>
<td>Pull coefficient</td>
<td>0.181</td>
<td>0.175</td>
<td>0.147</td>
<td>0.128</td>
<td>0.128</td>
<td>0.127</td>
</tr>
<tr>
<td>Pull economic amount/ RMB billion</td>
<td>354</td>
<td>342</td>
<td>287</td>
<td>250</td>
<td>250</td>
<td>247</td>
</tr>
</tbody>
</table>

- Update Secondary industry, Third industry
- Support New type urbanization
- Adjust the industry distribution in less developed regions

来源：杨正泽 王庆云——从城镇化视角看中国高速铁路发展 《交通运输系统工程与信息》
City development promoted by HSR

Great changes before and after the opening of Jinan West station
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- Influence of HSR on the development of society
## Land occupancy

### Indicators of HSR and Freeway on land occupancy

<table>
<thead>
<tr>
<th></th>
<th>Length /km</th>
<th>Acreage /hm²</th>
<th>Capacity /bn per•km</th>
<th>Acreage hm²/100 mn per•km</th>
</tr>
</thead>
<tbody>
<tr>
<td>JingHu Freeway</td>
<td>1262</td>
<td>About 10000</td>
<td>About 120</td>
<td>About 8.3</td>
</tr>
<tr>
<td>JingHU HSR</td>
<td>1318</td>
<td>About 4208</td>
<td>2101 (designed)</td>
<td>About 2</td>
</tr>
</tbody>
</table>

**Viaduct**
The structure of energy source

Total energy consumption of revenue

JingJin HSR: 0.24 ton of standard coal / RMB 10000

Equal to 43% of conventional railway

energy consumption/100 person km

EMU: <16 Kwh electricity 30% of car 20% of plane

来源: 李乐乐 周国华——我国高铁社会效益指标体系研究《世界科技研究与发展》
Influence on environment: Noise

**HSR:** Many measures to reduce vibration and noise, e.g. sound barrier, ballastless track

<table>
<thead>
<tr>
<th>CRH380A</th>
<th>Boeing747-300 take off</th>
<th>Car 120km/h Freeway</th>
</tr>
</thead>
<tbody>
<tr>
<td>300km/h</td>
<td>about 87.7 db</td>
<td>about 76 db</td>
</tr>
<tr>
<td>about 65 db</td>
<td></td>
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</tbody>
</table>

（跑道中心线的延长线上
距起飞滑跑开始点 6500m处测量）
Influence on environment: \( \text{CO}_2 \)

\( \text{CO}_2 \) emission

9.30 g/person km  
0.06 g/person km

来源：中国进入高铁时代 摘自中国论文网，原文地址：http://www.xzbu.com/2/view-453973.htm
### HSR boost tourism

#### 2009-2011 Growth rate of tourist along Wuhan-Guangzhou HSR

<table>
<thead>
<tr>
<th>city</th>
<th>Annual growth rate (%)</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
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<tbody>
<tr>
<td>Guangzhou</td>
<td>6.3</td>
<td>7.1</td>
<td>4.7</td>
<td></td>
</tr>
<tr>
<td>Qinyuan</td>
<td>26.4</td>
<td>15.3</td>
<td>20</td>
<td></td>
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<tr>
<td>Shaoguan</td>
<td>17.4</td>
<td>29</td>
<td>16.4</td>
<td></td>
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<tr>
<td>Chenzhou</td>
<td>17</td>
<td>24.6</td>
<td>40.8</td>
<td></td>
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<td>Hengyang</td>
<td>31.8</td>
<td>30.2</td>
<td>25.9</td>
<td></td>
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<td>14.5</td>
<td>30.3</td>
<td>33.2</td>
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</tr>
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<td>18.2</td>
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<td>25.6</td>
<td></td>
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<tr>
<td>Yueyang</td>
<td>15.6</td>
<td>5.9</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Chibi</td>
<td>13.8</td>
<td>30.4</td>
<td>30.9</td>
<td></td>
</tr>
<tr>
<td>Xianning</td>
<td>27.8</td>
<td>61.4</td>
<td>29.8</td>
<td></td>
</tr>
<tr>
<td>Wuhan</td>
<td>37.7</td>
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#### 2009-2011 Growth rate of tourism revenue along Wuhan-Guangzhou HSR

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<td>Xianning</td>
<td>66.8</td>
<td>74.1</td>
<td>30.5</td>
<td></td>
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<tr>
<td>Wuhan</td>
<td>36.1</td>
<td>47.4</td>
<td>39.6</td>
<td></td>
</tr>
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</table>

来源：覃成林 郑海燕——武广高铁对粤湘鄂沿线区域旅游发展影响分析 《经济问题探索》
HSR boost tourism

- **Beijing-shanghai HSR:** Temple and Cemetery of Confucius and the Kong Family Mansion in Qufu
  - In the first 3 days of May, 2014, visitor grow 6.2% and ticket income grow 17.2% compared to last year

- **Beijing-Guangzhou HSR:** Hubei Province
  - In 2013, visitor grow 18.5% and tourism income grow 17.2% compared to last year
## Passenger travel times

- 2007, China travels 1.1 times a year and covers 577.8 km by train
- 2012, 1.4 times, 518 km

### Source: UIC 2008 and Consultant’s estimated

<table>
<thead>
<tr>
<th>Country</th>
<th>Journeys/people/year</th>
<th>Km/people/year</th>
<th>Km/Journey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>25.9</td>
<td>1,253.0</td>
<td>48.3</td>
</tr>
<tr>
<td>France</td>
<td>16.8</td>
<td>1,346.7</td>
<td>80.3</td>
</tr>
<tr>
<td>Germany</td>
<td>23.1</td>
<td>934.4</td>
<td>40.4</td>
</tr>
<tr>
<td>Greece</td>
<td>12.3</td>
<td>739.7</td>
<td>60.0</td>
</tr>
<tr>
<td>Italy</td>
<td>10.6</td>
<td>782.0</td>
<td>73.7</td>
</tr>
<tr>
<td>Norway</td>
<td>11.0</td>
<td>582.5</td>
<td>52.9</td>
</tr>
<tr>
<td>Poland</td>
<td>5.8</td>
<td>466.4</td>
<td>80.4</td>
</tr>
<tr>
<td>Romania</td>
<td>3.4</td>
<td>309.8</td>
<td>91.3</td>
</tr>
<tr>
<td>Spain</td>
<td>13.3</td>
<td>505.3</td>
<td>38.1</td>
</tr>
<tr>
<td>Sweden</td>
<td>4.4</td>
<td>791.2</td>
<td>178.5</td>
</tr>
<tr>
<td>UK</td>
<td>20.9</td>
<td>849.9</td>
<td>40.6</td>
</tr>
<tr>
<td>India</td>
<td>5.7</td>
<td>670.7</td>
<td>118.0</td>
</tr>
<tr>
<td>Japan</td>
<td>70.9</td>
<td>2,009.9</td>
<td>28.3</td>
</tr>
<tr>
<td>Korea (Rep. of)</td>
<td>20.6</td>
<td>650.9</td>
<td>31.6</td>
</tr>
</tbody>
</table>
Future huge traffic demand

- **Year 2013**
  Passenger: 2.10 billion, 1.5 times/person

- **Year 2020**
  Demand: 1.45 billion people × 4 times
  \[= 5.8 \text{ billion persons}]\

Network: 129 thousand km
Thanks!

? Question