Shinkansen Investment before and after JNR Reform

Institute of Transportation Economics in Japan
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Outline of Presentation

1) Shinkansen Projects in JNR Era
2) Shinkansen Projects after JNR Reform
3) Through-Train Operation in Japan
4) Investment & Performance of Shinkansen Lines
Shinkansen Projects by JNR

Joetsu Shinkansen

Tohoku Shinkansen

Tokaido Shinkansen

Sanyo Shinkansen
JNR Reform in April 1987

Shinkansen operation was divided into JR East, JR Central and JR West
Projects after JNR Reform (1)

<Shinkansen Lines>
- Completed by JNR reform (1987)
- Completed since JNR reform
- Under construction
- Planning stage

Completed since JNR reform:
- Tokyo - Ueno (Shin-)
- Osaka
- Hakata
- Takasaki
- Nagano
- Hokuriku Shinkansen
- Morioka
- Shin-Aomori
- Sapporo
- Tohoku Shinkansen
- Tsuruga
- Ueno
- Tokyo
- Kagoshima-Chuo
- Nagasaki

Under construction:
- Takeo-Onsen
- (Shin-)Osaka
- Kyushu Shinkansen

Planning stage:
- (Shin-)Osaka

Completed by JNR reform (1987):
- Takeo-Onsen
- (Shin-)Osaka
- Kyushu Shinkansen
Projects after JNR Reform (2)

<Conventional Line>

- Mini-Shinkansen (completed)
  - Akita
  - Shinjo
  - Fukushima

(Dedicated) High-speed train

Mini-Shinkansen train
Line Length and Transport Volume

(Transport Volume: million passenger-km)

Construction of New Shinkansen Lines

<New Shinkansen Lines>

- Completed since JNR reform
- Under construction

1. Construction: Public Works
   - Lease Fee paid by JR
   - Subsidies from Government
     (Central Gov.: Local Gov. = 2:1)

2. Operation: Vertical Separation
   - JR Companies responsible for O&M
   - JRTT (Government Agency)
     Owner of Infra. & Facilities
Usage Fees

Case without Shinkansen Line

Case with a Shinkansen Line

Expected Revenue

Expected Expenses

Usage fees of new Shinkansen Lines

The amount is calculated based on “b-a”

Benefits received as an operator of the new Shinkansen Line

(Calculation Period) 30 years old
Through-Train Operation in Japan (1)

Network of Railway A

Rolling Stock of Railway A

Operation by Railway A

Revenue to Railway A

Network of Railway B

Rolling Stock of Railway B

Operation by Railway B

Revenue to Railway B
Clear Separation of Operational Responsibility
Through-Train Operation in Japan (3)

Timetable at Tokyo Station

3 minute train headway
Transport Volume of the Lines

(Unit: million passenger km)

Passenger Traffic Density (1)

Passenger Traffic Density (passengers/day)

= Transport Volume (Passenger km)/ (Operating Line Length × Operating Days)
## Passenger Traffic Density (2)

### Table: Traffic Density of Shinkansen Lines in 2011

(Unit: thousand passengers / day)

<table>
<thead>
<tr>
<th>No.</th>
<th>Name of Shinkansen Line</th>
<th>Traffic Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tokaido</td>
<td>219.6</td>
</tr>
<tr>
<td>2</td>
<td>Sanyo</td>
<td>71.8</td>
</tr>
<tr>
<td>3</td>
<td>Tohoku</td>
<td>50.8</td>
</tr>
<tr>
<td>4</td>
<td>Joetsu</td>
<td>39.6</td>
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<tr>
<td>5</td>
<td>Hokuriku</td>
<td>17.8</td>
</tr>
<tr>
<td>6</td>
<td>Kyushu</td>
<td>17.3</td>
</tr>
</tbody>
</table>

Source: Calculation based on MLIT (2013), JR West (2013), JR Central (2013a)
Passenger Traffic Density (3)

Tohoku Shinkansen Line

- Closer to Tokyo

- The section closer to Tokyo

1) Transport volume is large
2) Ridership is increasing

Source: JR East (2013)
The sale of Shinkansen commuter passes is increasing. Shinkansen expanded the commutable districts around Metropolitan areas.
【1. Revenue from Shinkansen Lines】
Revenue from Shinkansen has increased largely.


【2 Revenue from Conventional Lines】
### (Table) Share of Revenue and Rolling Stock Kilometers

<table>
<thead>
<tr>
<th></th>
<th>Shinkansen Share of Transport Revenue *1</th>
<th>Shinkansen Share of Rolling Stock Kilometers *2</th>
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<tr>
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<td>1987</td>
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<td>JR East</td>
<td>22%</td>
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<td>46%</td>
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* 1: Shinkansen revenue / total transport revenue
* 2: Shinkansen rolling stock kilometers / total rolling stock kilometers

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<td>42%</td>
<td>46%</td>
<td>&gt; 37%</td>
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<tr>
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Shinkansen is a better revenue earner per rolling stock kilometer

* 1: Shinkansen revenue / total transport revenue
* 2: Shinkansen rolling stock kilometers / total rolling stock kilometers

Final Comment

1) This report primarily discussed Shinkansen’s effects on operating companies.

2) Shinkansen operation has large impacts on the social and economic development.
   Ex.) raising real estate value, easing highway congestion, stimulating job creation, etc.

3) In order to evaluate the effectiveness of the project, it is necessary to include these social and economic benefits.
References (Selected)

- Institute of Transportation Statistics (1995) *JNR Annual Railway Statistic*, Institute of Transportation Statistics
- JR Central (2007) *20 Year History of JR Central* JR Central
- JR Central (2013a) *Annual Report 2013*, JR Central
- MLIT (2013) *Railways in terms of the Figures*, Institute for Transport Policy Studies
Thank you for your attention

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