



Shinkansen Investment before and after JNR Reform

Institute of Transportation Economics in Japan

Fumio KUROSAKI, Ph.D.



Outline of Presentation

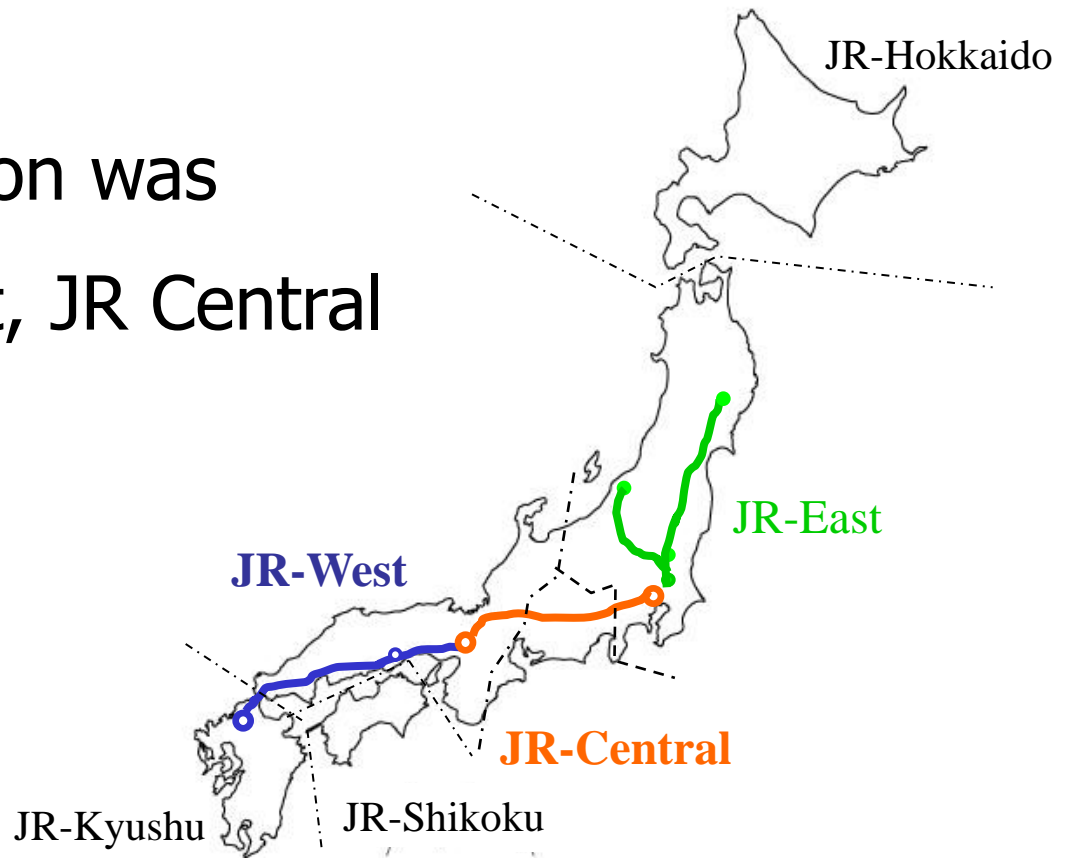
- 1) Shinkansen Projects in JNR Era
- 2) Shinkansen Projects after JNR Reform
- 3) Through-Train Operation in Japan
- 4) Investment & Performance of Shinkansen Lines

Shinkansen Projects by JNR



JNR Reform in April 1987

Shinkansen operation was divided into JR East, JR Central and JR West



Projects after JNR Reform (1)

<Shinkansen Lines>

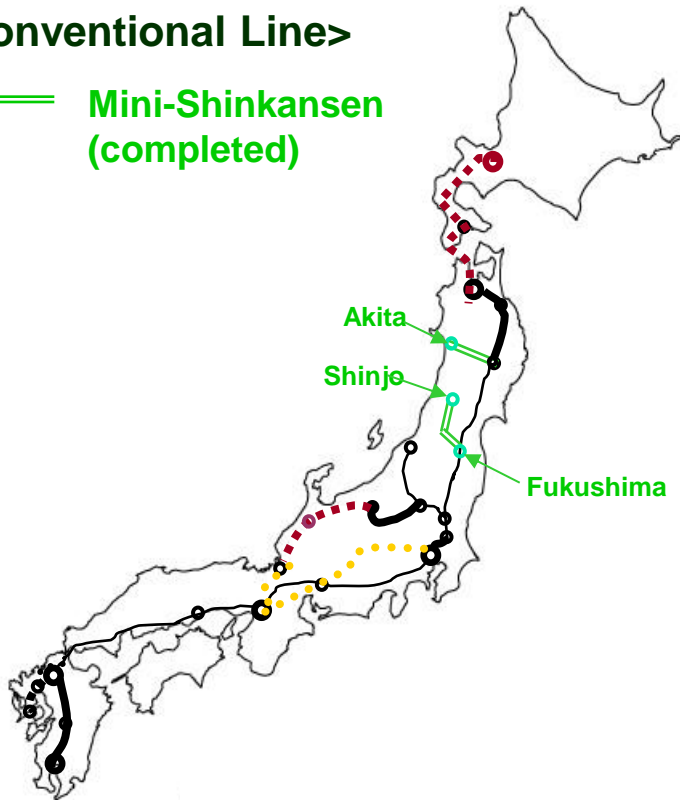
- Completed by JNR reform (1987)
- Completed since JNR reform
- ⋯ Under construction
- ⋯ Planning stage



Projects after JNR Reform (2)

<Conventional Line>

== Mini-Shinkansen
(completed)



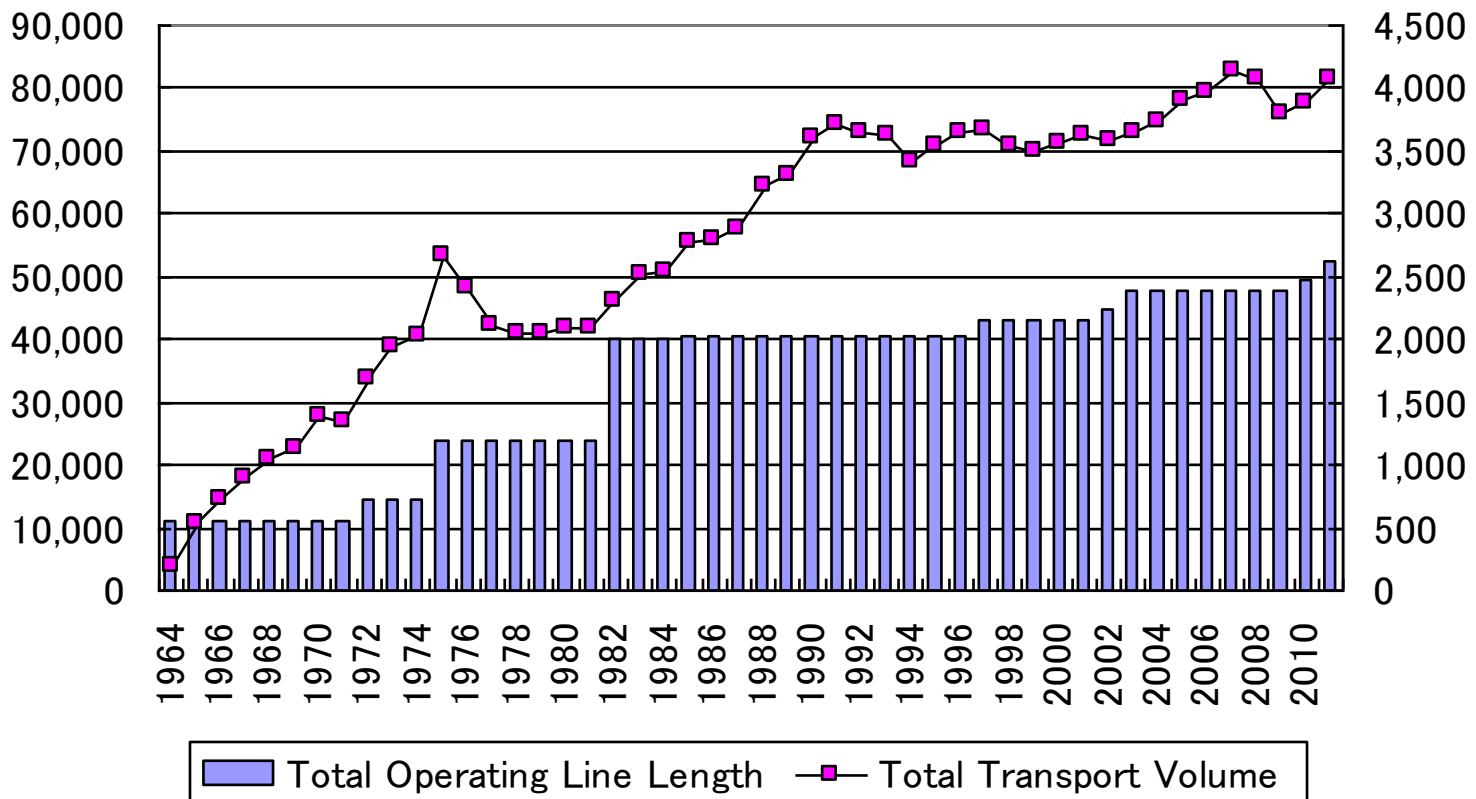
(Dedicated) High-speed train

Mini-Shinkansen train

Line Length and Transport Volume

(Transport Volume: million passenger-km)

(Line Length: km)

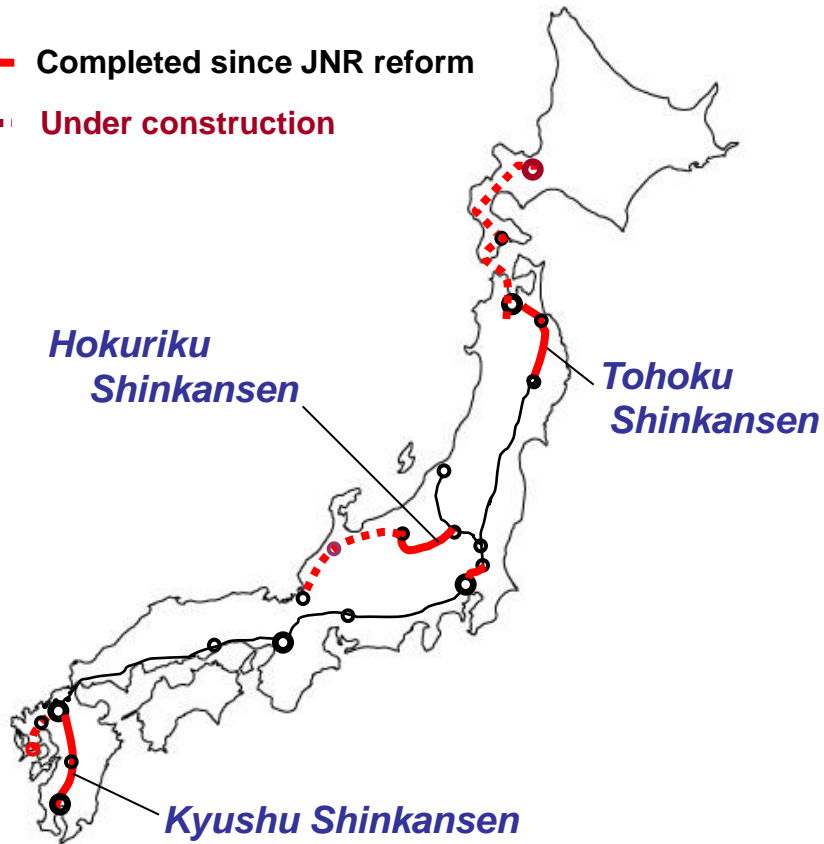


Source: Institute of Transportation Statistics (1995), MLIT (2013)

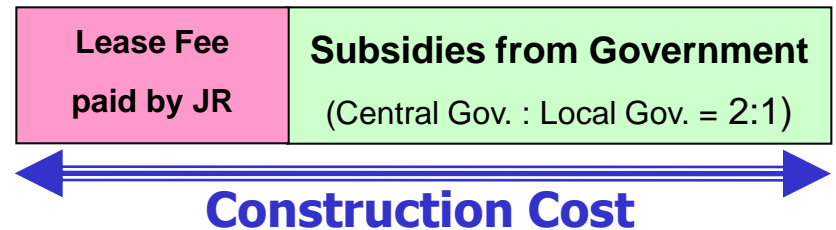
Construction of New Shinkansen Lines

<New Shinkansen Lines>

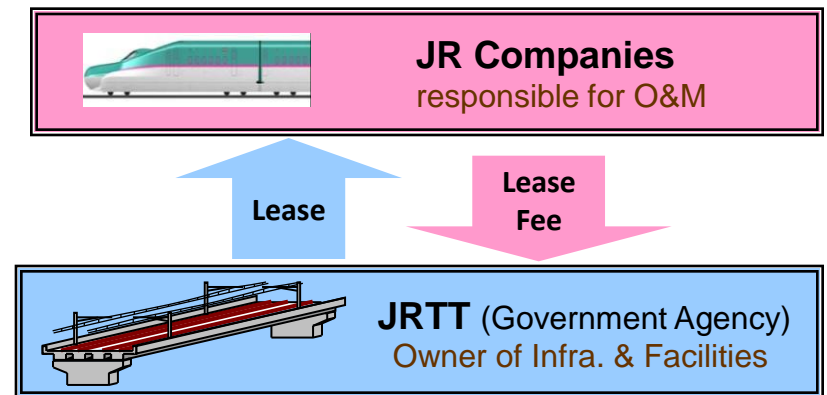
- Completed since JNR reform
- - - - Under construction





1. Construction: Public Works

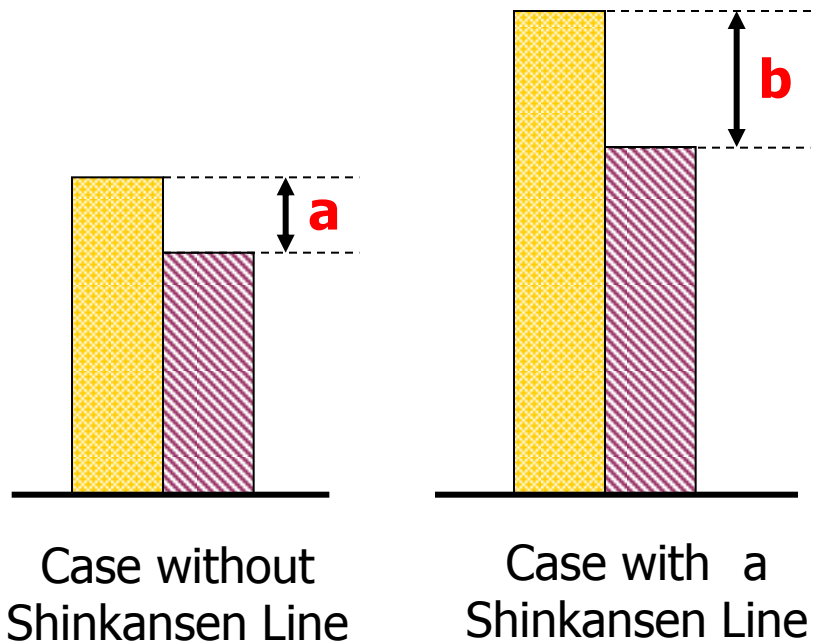


2. Operation: Vertical Separation

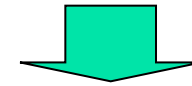


Usage Fees

-  : Expected Revenue
-  : Expected Expenses



Usage fees of new Shinkansen Lines



The amount is calculated
based on "b-a"

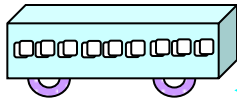
*Benefits received as an
operator of the new
Shinkansen Line*

(Calculation Period) 30 years old

Through-Train Operation in Japan (1)

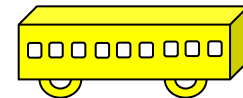
Network of Railway A

Rolling Stock of Railway A



Network of Railway B

Rolling Stock of Railway B



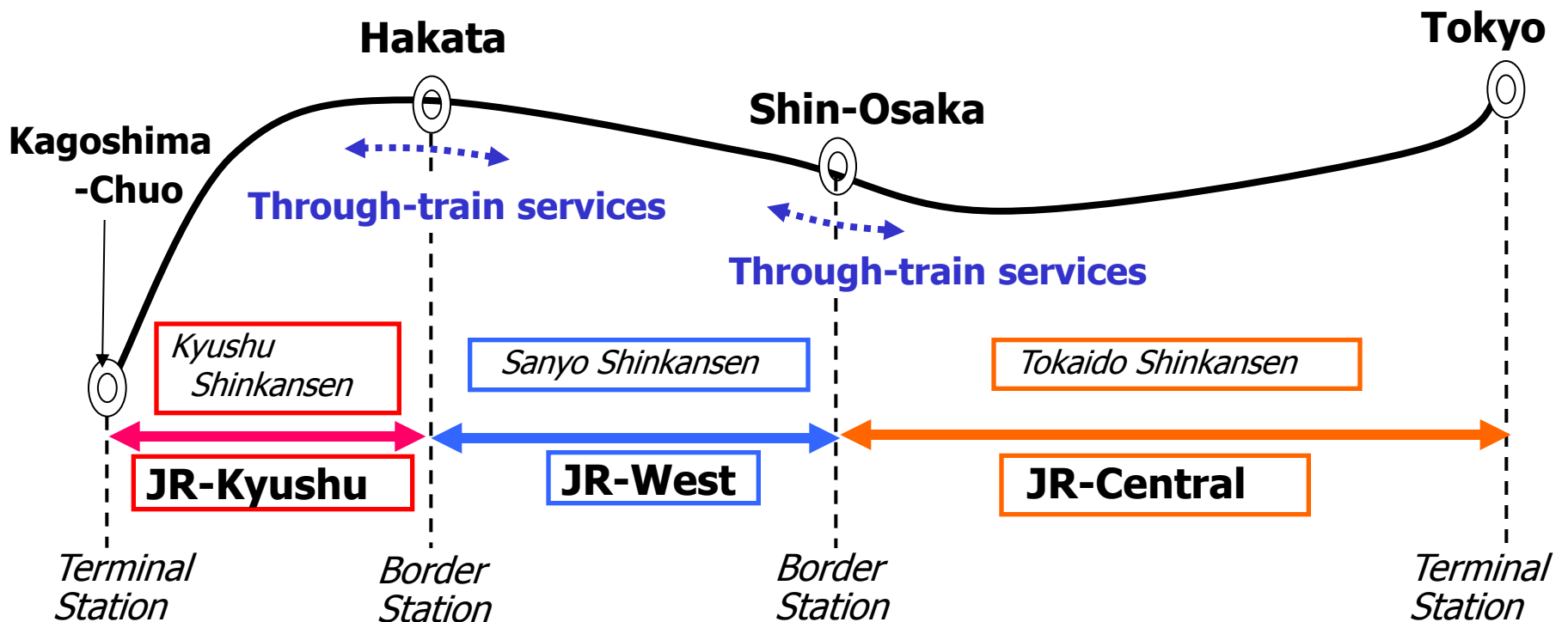
Operation by Railway A

Operation by Railway B

Revenue to Railway A

Revenue to Railway B

Through-Train Operation in Japan (2)



Clear Separation of Operational Responsibility

Through-Train Operation in Japan (3)



3 minute train headway

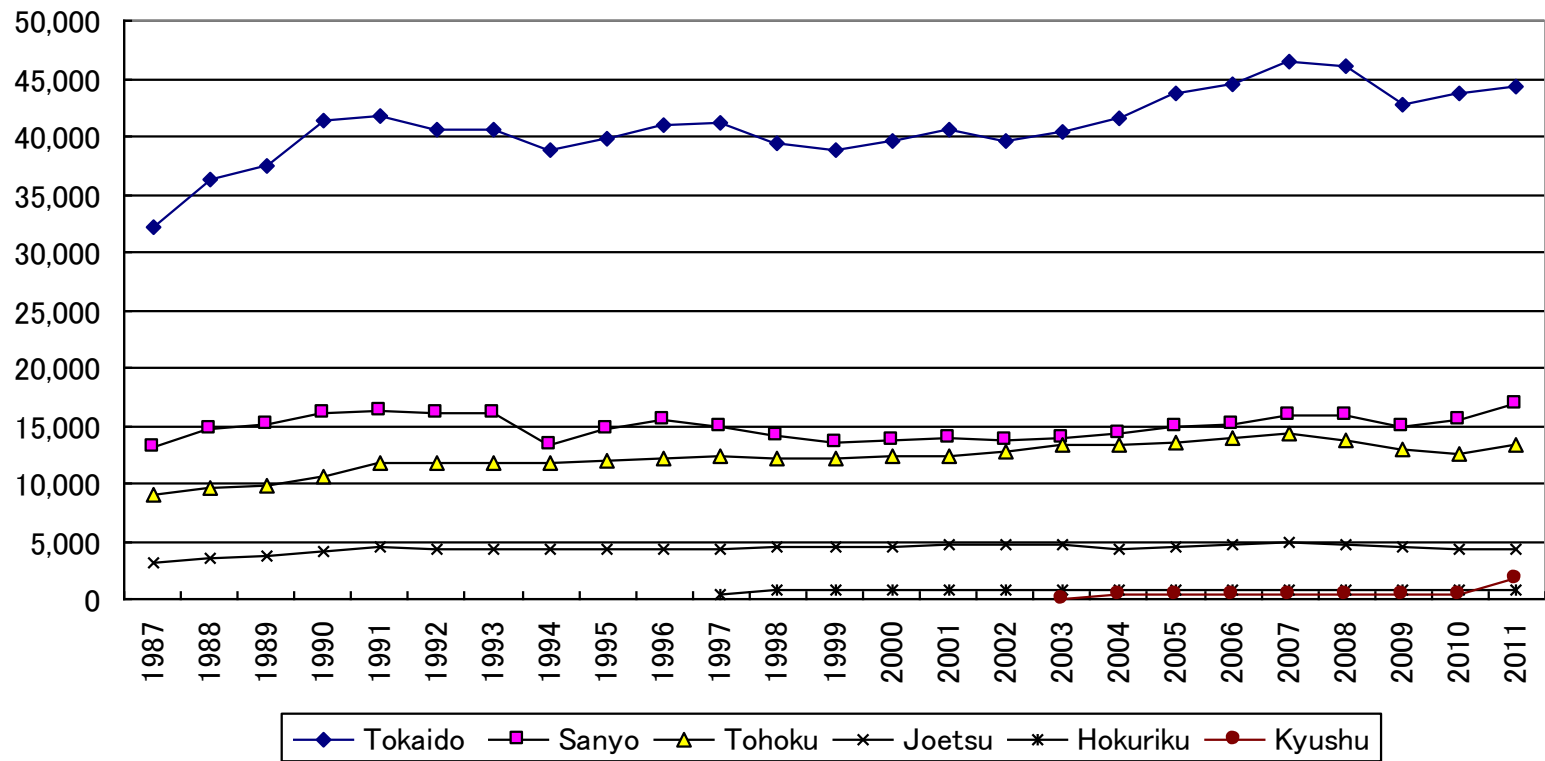
Timetable at Tokyo Station

東海道・山陽新幹線 発車 Tōkaidō, Sanyō Shinkansen Dep				
列車名 Train	列車番号 Train No.	時刻 Time	行先 Destination	のりば Tracks
KODAMA	663	14:26	Nagoya	15
NOZOMI	41	14:30	Hakata	19
HIKARI	517	14:33	Shin-Ōsaka	18
NOZOMI	115	14:50	Hiroshima	15
KODAMA	665	14:56	Shin-Ōsaka	17

rains. Please notify station staff

Transport Volume of the Lines

(Unit: million passenger km)

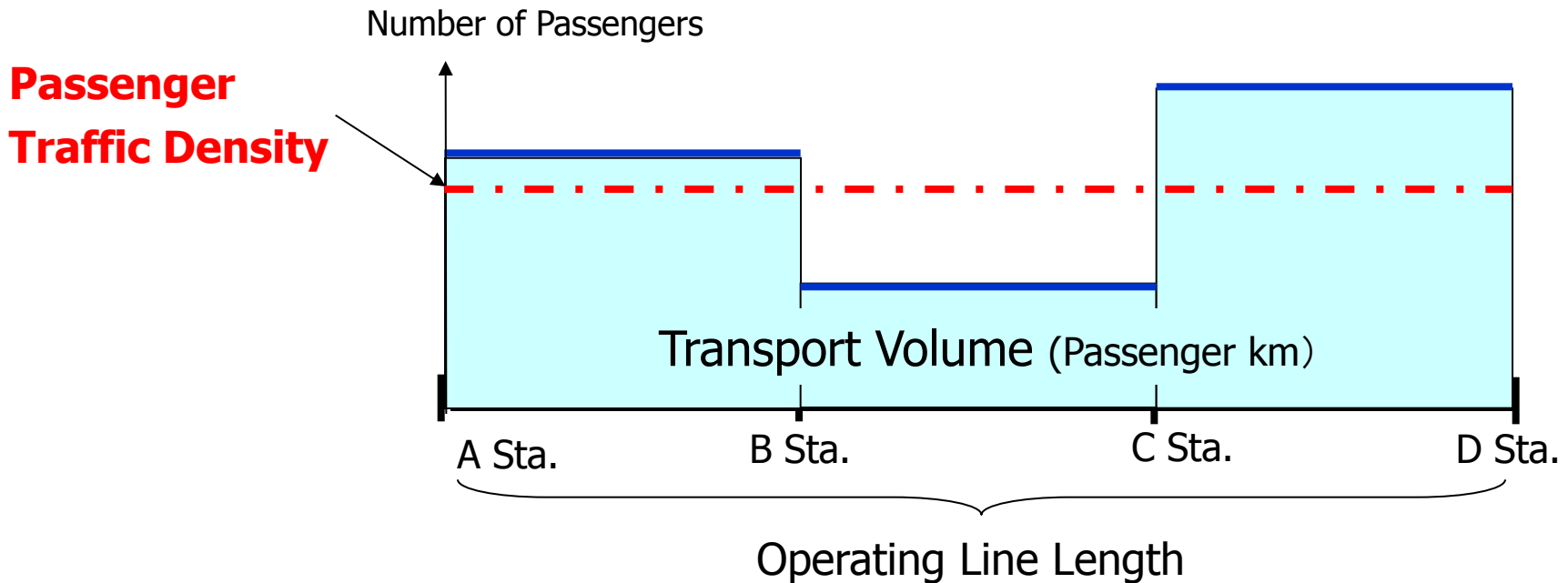


Source: MLIT (2013), JR West (2013), JR Central (2007; 2013a)

Passenger Traffic Density (1)

Passenger Traffic Density (passengers/day)

= **Transport Volume** (Passenger km) / (**Operating Line Length** × **Operating Days**)





Passenger Traffic Density (2)

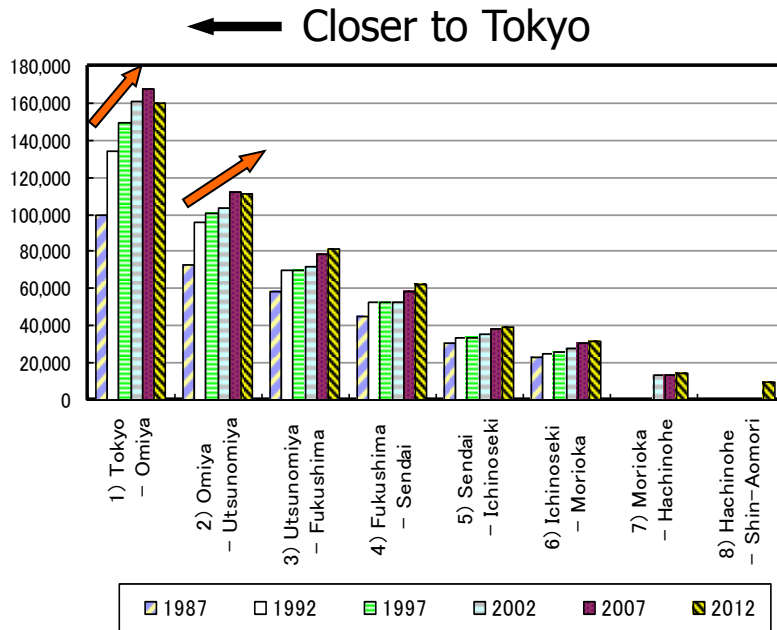
Table: Traffic Density of Shinkansen Lines in 2011

(Unit: thousand passengers / day)

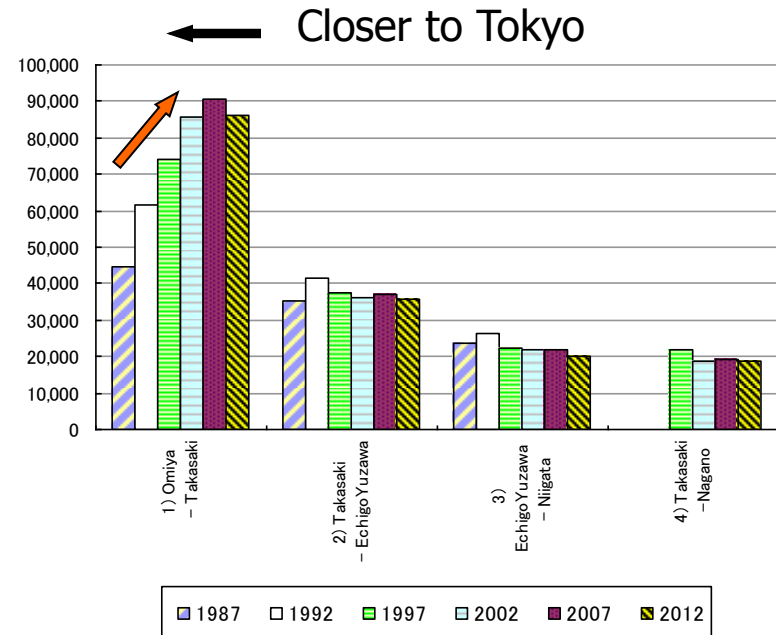
No.	Name of Shinkansen Line	Traffic Density
1	Tokaido	219.6
2	Sanyo	71.8
3	Tohoku	50.8
4	Joetsu	39.6
5	Hokuriku	17.8
6	Kyushu	17.3

Source: Calculation based on MLIT (2013), JR West (2013), JR Central (2013a)

Passenger Traffic Density (3)



Tohoku Shinkansen Line



Joetsu and Hokuriku Shinkansen Line

Source: JR East (2013)

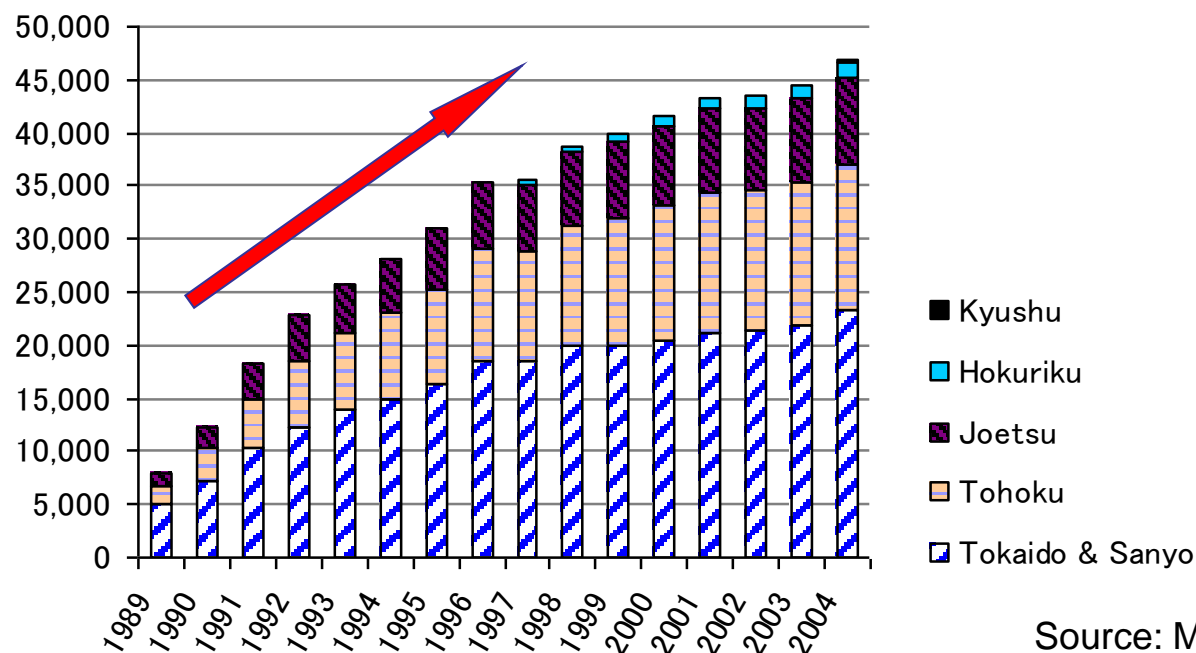
The section closer to Tokyo



- 1) Transport volume is large
- 2) Ridership is increasing

Shinkansen Commuters

(Persons)



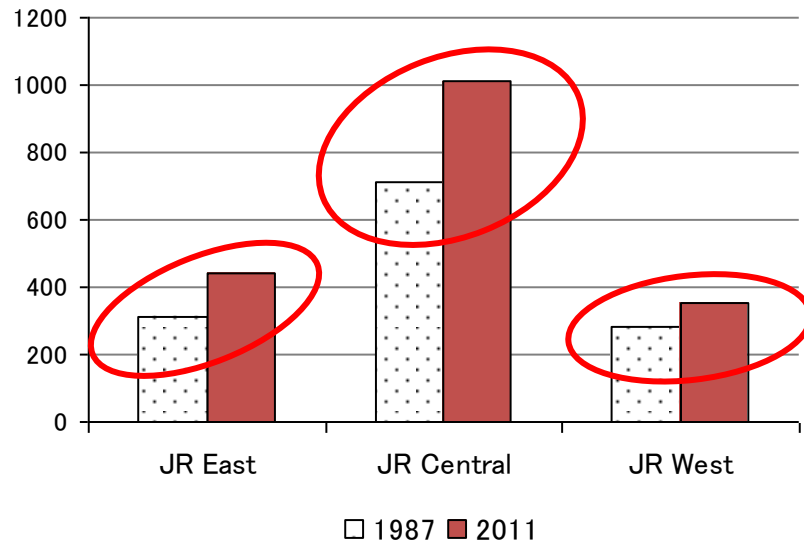
Source: MLIT (2013)

The sale of Shinkansen commuter passes is increasing.

← *Shinkansen expanded the commutable districts around Metropolitan areas.*

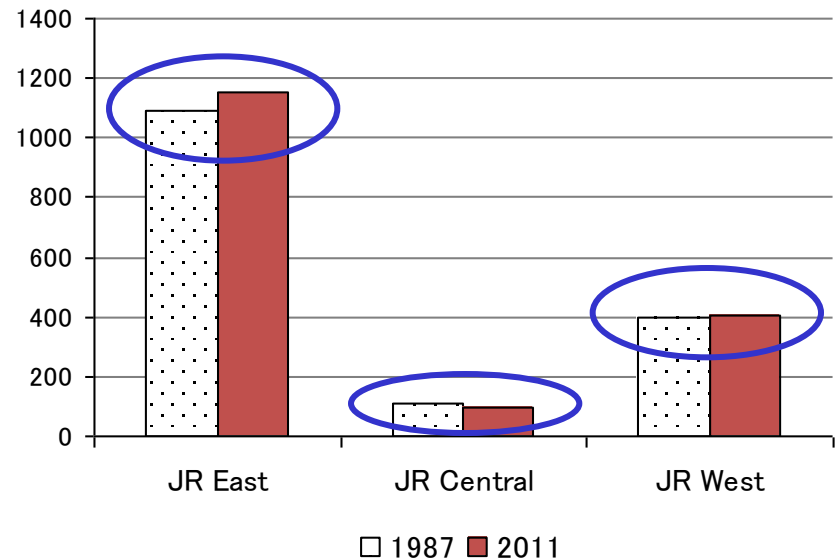
Revenue from Shinkansen & Conventional Lines

(Unit: billion yen)



【1. Revenue from **Shinkansen Lines**】

(Unit: billion yen)



【2 Revenue from **Conventional Lines**】

Source: JR East (2012), JR Central (2013a), JR West (2013)

Revenue from Shinkansen has increased largely.



Management of JRs and Shinkansen Lines

(Table) Share of Revenue and Rolling Stock Kilometers

	Shinkansen Share of Transport Revenue *1		Shinkansen Share of Rolling Stock Kilometers *2
	1987	2011	2011
JR East	22%	28%	20%
JR Central	87%	91%	81%
JR West	42%	46%	37%

* 1: Shinkansen revenue / total transport revenue

* 2: Shinkansen rolling stock kilometers / total rolling stock kilometers

Source: Calculation based on JR East (2012), JR Central (2013b), JR West (2013)

Management of JRs and Shinkansen Lines

(Table) Share of Revenue and Rolling Stock Kilometers

	Shinkansen Transport Revenue ^{*1}		Shinkansen Share of Rolling Stock Kilometers ^{*2}	
	1987	2011		2011
			>	
			>	
			>	

Increasing

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

Source: Calculation based on JR East (2012), JR Central (2013b), JR West (2013)



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)

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- JR Central (2007) *20 Year History of JR Central* JR Central
- JR Central (2013a) *Annual Report 2013*, JR Central
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Thank you for your attention

Fumio KUROSAKI, Ph.D.

