

# Sensible Politics and Transport Theories? —Japan's National Railways in the 20th Century

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## Transportation Benefits and Debts

Transportation systems changed tremendously during the 20th century, but not all these changes were positive. I am sure everyone has their own ideas about the benefits and harmful effects of modern transportation and this article presents some of my own opinions on the matter. Modern transportation lets us move around much more freely than our ancestors ever could and an unbelievable number of people and things are transported about the globe, greatly changing many aspects of life, even political systems and economies. Statistics prove that modern transportation has provided us with many benefits and material comforts.

However, vast amounts of natural resources have been used to construct and operate our modern transportation systems, placing a huge burden on the shoulders of future generations to maintain them. In addition, these systems also cause accidents and harm the environment—problems that are still way out of control and that we still do not know how to solve.

Future generations may inherit transportation systems that do not even serve them well in the 21st century, but will have to pay off the huge debt created by the transportation infrastructure developed this century. They will also be left without any easy solution to improve the undesirable living environment exemplified by degraded urban areas, huge energy consumption, and constant danger of accidents. As 1999 draws to a close, I can almost hear the sighs of these future generations.

An examination of transportation in Japan, especially the now-defunct Japanese National Railways (JNR), shows that Japan's national rail system brought both advantages and disadvantages. I can only wonder why the Japanese people at that time did not act more wisely. Many mistakes were made by politicians and

transportation experts, but they were also attributable to the Japanese ways of thinking—what we could call the Japanese mindset—that had become customary over centuries.

I suppose it could be argued that the Japanese did their best to break out of this traditional mindset and in some ways they did move beyond it. Some examples might be the development of the Tokaido Shinkansen (1964), the break-up and privatization of JNR (1987), and agreements permitting trains operated by different railway companies to travel on each others' tracks in urban areas (since 1960).

But even as the 20th century is coming to an end, politicians are still obsessed with the idea of expanding the shinkansen network, and using the same expansionist approach to develop the nation's expressways. It seems to me that transportation theories are incapable of preventing this runaway expansion—indeed, perhaps they are sometimes even used to promote it, a point I will discuss in greater depth later.

## What Went Wrong with JNR?

In Japanese society, arguing has never been considered good form. It was believed that arguments disrupt social harmony, and that there are ways to reach a common understanding without verbal disagreement. This reticence towards argument with others has created the following three cultural attributes:

- Dependence on foreign culture and assumption that foreign cultural attributes are beneficial. Instead of developing new ideas ourselves, we have tended to adopt useful things of other countries. Japan's main philosophical beliefs came from the Asian mainland as long ago as the 6th century in the form of Confucianism and Buddhism and took root in Japan

in the 8th century. Ever since then, we have tended to look abroad for academic and philosophical concepts.

- Submission to political authority. Japanese tend to remain docile in the face of authority. We rarely think of the need to have a written social contract—nor have we put much faith in democratic principles. Instead, we have expected the political system to provide citizens with what they need in a top-down approach.
- Dependence on politicians. Ever since Japan adopted a legislative form of government in 1889, people have tended to assume that there is a good chance of getting what they need just by asking the politicians. This tendency became even stronger after the birth of true democracy in Japan in 1947.

Taken together, these three cultural attributes tend to ensure that responsibility is not placed on the shoulders of any one individual.

These attributes are clearly seen in the transportation sector. As an example of the first attribute, Japan has tended to adopt foreign transportation technologies, systems and even theories, without considering whether they are really suitable for the country.

As an example of the second attribute, public transportation companies never argue with or oppose the politicians' ill-founded policies, such as when they were told to set fares well below costs.

As an example of the third attribute, when railway companies asked for further government investment, the politicians often agreed, hoping these investments would boost their next election chances. This third attribute is probably seen in every country to some extent, but the second attribute—willing submission to political authority—is perhaps unique to Japan.

As I will mention later, in 1906, the government nationalized most of the



Express train on Tokaido main line around 1900 (Transportation Museum)



'Tsubame' limited express train around 1930 (Transportation Museum)

railway network to put it under direct government control, where it remained until May 1949. Then, in June 1949, management of the railway network came under the control of JNR, a public corporation, where it remained until March 1987.

One would expect that an entity under direct government control would be inefficient and poorly administered, while a public corporation would be efficient and thrive under strict management. But the opposite was true. In 1949, responsibility for JNR management was divided among different offices. Although JNR was a public corporation, it had little independence—politicians frequently interfered with management, making irrational demands that had to be accepted. It was the *Diet* (the national legislative body) that controlled the railway's annual plans, budget, and fare revisions. Not surprisingly, this arrangement eventually led to JNR posting increasingly deeper deficits year-after-year.

On the other hand, up until 1949, at least during peacetime, the government railways never ran a deficit, even during the global depression of 1929 and the early 1930s. Between 1906 and 1949, the government wielded direct control and the minister in charge of rail transport had full

responsibility for revenues and expenditures. Because this responsibility was clearly stated, there was no squabbling over how the fiscal pie, with its limited resources, should be divided.

But once the rail network was placed in the hands of a public corporation, in the form of JNR, its management fell on shaky ground. Fortunately, in the mid-1950s, the economy started growing at a staggering pace while use of motor vehicles and airplanes still lagged far behind other countries. From 1957 to 1963, JNR enjoyed a 7-year period in the black with the highest profits earned in FY1963—those were JNR's golden years, but unfortunately, also its last.

Ironically, after the opening of the Tokaido Shinkansen in October 1964, JNR fell into the red. The next 23 years saw endless deficits, leading to the ultimate division and privatization of JNR in 1987. One reason for the sudden reversal was that the Tokaido Shinkansen lost money during the early years while the government insisted that fares must remain low. In addition, the necessary business measures that could have turned things around were delayed or never implemented.

Because neither the politicians nor the public faced up to this bleak reality, JNR soon fell into a pit from which it could

never recover, forcing taxpayers to assume a horrendous debt of some ¥23 trillion out of a total of ¥28 trillion that will stretch far into the 21st century. And even now, although the debt problem is well known, politicians still continue to call for further investments in the shinkansen network and other railway lines.

We should have heeded the warnings made by two very astute people long ago. One was a talented politician who held considerable power when railway technology was first introduced to Japan. The other was a transportation expert writing in the early 20th century. The next section discusses their advice, while the subsequent section introduces statistics to show what went wrong in the 20th century.

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### Two Prophetic Warnings in 1870 and 1903

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Japan began construction of its first railway in 1870 and the first stretch of line opened between Tokyo and Yokohama in 1872.

One powerful politician of the time, Saigo Takamori, said this in 1870: 'Building telegraph lines, laying railways and using steam engines bring us marvellous benefits. But we must carefully consider why we need telegraphs and railways; and we must

not search after the prosperity and luxury that foreign countries enjoy before fully debating the pros and cons of looking abroad for ideas on everything from architecture to entertainment. Otherwise we will waste valuable resources, our country will become weak, we will become frivolous, and in the end, bankrupt’.

Saigo was an astute student of Confucianism before the Meiji Restoration (1868), and was well aware that the treasuries of the Shogunate and provincial governments had been severely depleted due to wasteful spending and crop failures. He issued this warning in the hope that the new Meiji government would not repeat the mistakes of the past when adopting new policies, including rail transport policies.

By the end of the 19th century, students at several universities began studies on transportation systems. One scholar, Seki Hajime, who had studied in Europe, introduced the theories of C. Colson of France in his book, *Transportation Studies of C. Colson* (1903). He wrote, ‘France is pushing forward with many construction projects that will have to be paid for in the future. It is important that the benefits are worth the cost. And in the case where only some people enjoy these benefits, it is only fair that they assume the costs as users.

‘This fact is obvious, although it is often ignored. The public is very eager to have transportation systems built and maintained, and to see railway fares kept low. In other words, the people want their transport infrastructure developed, but do not want to take responsibility for it. They do not realize that the general public must pay for this development, either through taxation or some other measure. The problem is that taxes are already high in France, and increasing them would hinder further industrial development. It would be a great mistake for the French to increase annual tax revenues by Fr4 billion in order to make up for the shortfall caused by reducing annual rail fares by a total of Fr1.3 billion.

‘In conclusion, I would like to ask the reader to consider the relationship between transportation systems and public finances. Technical development is at the heart of modern progress, so people want more of it, but at the same time they want lower fares. Yet true progress is based on the understanding that expenditures must be justified by results. If we want to continue on the road to progress, we must remain cautious, ensuring that transportation infrastructure, which benefits some people, is not negated by excessive construction costs borne by the state.’

Seki later served as mayor of Osaka. It was while he was active in municipal politics that Osaka’s first subway line opened.

Unfortunately, Seki’s warnings were ignored in the second half of the 20th century. His admonition, that ‘expenditures must be justified by results’ was only given

lip service. Planners ignored reality. The advantages obtained through modern transportation in Japan are now being negated, as the national debt to pay for transportation infrastructure has ballooned out of proportion.

### Government Railways and JNR—Traffic Volumes, Revenues and Expenditures

When Japan’s first train started running in 1872, there were 29.0 km of line in operation. By 1905, despite fund shortages, the government lines extended to 2562 km. The government also permitted the construction of private railway lines, which soon stretched to 5231 km, slightly more than double the length of the government lines. The private railways experienced booms interspersed with slumps during

**Table 1 Passengers and Freight Carried by Government Railways (1905–25)**

Fiscal Year	Route-km (km, at fiscal year end)	Employees (1000)	Passenger-km (100 million)	Tonne-km (100 million)
1905	2,562.4	28.9	15.21	6.50
6	4,977.9	59.6	19.71	11.67
7	7,153.2	88.3	37.87	23.56
8	7,311.1	89.9	44.15	29.91
9	7,442.2	90.1	—	31.25
10	7,838.0	95.6	48.90	34.77
11	8,117.7	103.4	54.44	38.39
12	8,395.9	110.0	58.36	44.01
13	8,807.4	112.1	59.40	49.93
14	9,156.3	115.0	58.32	48.77
15	9,268.2	112.1	62.06	54.11
16	9,428.6	115.3	68.48	68.33
17	9,658.5	125.9	88.76	82.30
18	9,780.9	139.0	105.72	91.70
19	9,990.5	158.6	127.82	102.90
20	10,436.1	163.8	134.93	96.91
21	10,820.9	168.4	143.19	96.28
22	11,274.6	180.9	156.63	104.07
23	11,804.8	188.8	171.70	104.51
24	12,147.8	195.6	181.06	115.23
25	12,593.2	195.9	187.41	118.16

① Private railways purchased ② World War I

Note: Number of employees includes all staff in the entire organization, including non-railway staff.

economic recessions. Interestingly, even major trunk lines like those lines from Tokyo to Aomori in northern Japan, and from Osaka to Shimonoseki in western Japan, were privately owned. During this period of rapid expansion, the

argument was frequently made that the nation's entire railway network should be owned and operated by the state. The role played by the railways in the Russo-Japanese War (1904–1905) prompted the government to decide, in 1906, to

nationalize all railways except lines serving local regions. The government finished purchasing the private lines in 1907 to form a government railway network of slightly more than 7,000 route-km (Table 1). By 1920, the government railway network had

**Table 2 Passengers and Freight Carried by Government Railways, JNR and JR (1926–98)**

Fiscal Year	(1) Route-km (at fiscal year end)	(2) Employees (1000)	(3) Passenger-km (100 million)	(4) Shinkansen passenger-km (100 million); also included in (3)	(5) Tonne-km (100 million)	Fiscal Year	(1) Route-km (at fiscal year end)	(2) Employees (1000)	(3) Passenger-km (100 million)	(4) Shinkansen passenger-km (100 million); also included in (3)	(5) Tonne-km (100 million)
1926	12,863.8	200.5	192.4		124.6	1963	20,664.7	455.8	1,527.1		591.6
27	13,394.1	206.4	200.5		130.4	64	20,741.2	461.9	1,641.8	39.1	588.8
28	13,694.5	210.9	215.9		134.1	65	20,754.0	462.4	1,740.1	106.5	564.1
29	14,151.9	210.5	213.5		132.1	66	20,783.2	469.7	1,757.6	144.9	549.6
30	14,574.9	204.6	198.8		114.2	67	20,774.8	467.8	1,843.1	179.1	585.5
31	15,014.0	198.7	191.2		110.9	68	20,826.5	466.4	1,848.1	210.3	589.6
32	15,372.1	198.8	190.0		110.3	69	20,833.5	466.9	1,815.2	228.2	601.7
33	15,844.5	201.5	208.2		124.8	70	20,890.4	459.7	1,897.3	278.9	624.4
34	16,535.1	209.5	225.7		139.6	71	20,882.9	450.3	1,903.2	268.0	612.5
35	17,138.2	218.4	241.7		145.9	72	20,924.2	441.1	1,978.3	338.3	585.6
36	17,530.1	227.7	262.2		163.0	73	21,099.1	432.9	2,081.0	389.9	574.0
37	17,934.0	253.2	290.5		189.2	74	21,161.0	430.3	2,155.6	406.7	515.8
38	18,178.7	272.2	336.3		219.1	75	21,271.9	430.1	2,152.9	533.2	465.8
39	18,297.5	309.9	420.6		252.9	76	21,276.1	429.2	2,107.4	481.5	455.3
40	18,400.0	339.6	493.4		279.5	77	21,306.5	428.9	1,996.5	421.9	405.9
41	18,495.5	384.6	555.5		298.7	78	21,306.9	426.7	1,958.4	410.7	404.1
42	18,581.4	401.8	604.5		339.5	79	21,322.1	420.8	1,946.9	409.9	422.8
43	19,725.5	470.6	740.7		428.0	80	21,321.7	413.6	1,931.4	417.9	369.6
44	20,056.3	524.7	772.8		412.3	81	21,418.8	401.4	1,921.1	417.2	334.0
45	19,619.8	518.1	760.3		189.8	82	21,386.5	386.7	1,907.7	461.0	302.5
46	19,692.0	573.1	874.5		189.7	83	21,319.2	358.0	1,929.1	504.4	270.9
47	19,752.3	610.5	911.6		222.4	84	21,091.0	326.0	1,941.8	508.3	227.2
48	19,759.6	604.2	820.0		264.1	85	20,788.7	276.8	1,974.6	554.2	216.3
49	19,765.3	490.7	696.6		298.8	86	19,639	223.9	1,983.0	559.4	201.5
50	19,786.4	473.5	691.1		333.1	87	21,271	192	2,046.8	574.1	200.3
51	19,849.6	442.2	790.4		398.8	88	21,015	181	2,175.9	643.5	230.3
52	19,902.6	447.4	804.8		392.5	89	20,339	174	2,226.7	659.7	246.8
53	20,007.8	446.8	835.5		409.9	90	20,243.5	169	2,376.6	721.7	267.3
54	20,046.0	442.8	870.4		398.9	91	20,194.2	169	2,470.3	742.2	267.0
55	20,093.1	442.5	912.4		425.6	92	20,205.9	168	2,496.1	730.6	262.4
56	20,186.4	442.6	980.8		469.2	93	20,202.4	167	2,500.2	725.6	250.3
57	20,275.5	443.9	1,012.4		482.2	94	20,203.0	167	2,443.8	682.5	240.8
58	20,357.0	444.8	1,062.1		452.9	95	20,081.2	166	2,490.0	708.3	247.0
59	20,402.1	449.0	1,141.9		496.7	96	20,077.7	163	2,517.2	729.5	246.0
60	20,481.9	448.4	1,239.8		535.9	97	20,109.5	160	2,476.5	732.1	243.0
61	20,519.3	451.4	1,317.5		575.4	98	20,105.4	NA	2,428.1	710.2	226.4
62	20,516.3	452.7	1,411.9		562.9						

① Great Depression ② World War II ③ High economic growth period ④ 'Bubble' economy ⑤ Great Hanshin Earthquake

Note: Since 1987, the JR group has counted shinkansen route-km and parallel narrow-gauge main line route-km separately in the total network route-km. Since 1987, the number of employees includes only those engaged in rail operations. Passenger and freight figures are for rail transport only. Tonne-km figures up to FY1986 include freight carried free-of-charge; thereafter, only paid freight is included.

exceeded 10,000 route-km, and reached more than 18,000 route-km in 1940 (Table 2).

Passengers and freight tonnage increased steadily over the years, except for slack periods during recessions, such as the economic downturn soon after World War I, and during the depression in the late 1920s and the early 1930s.

During this period, misguided politicians insisted on extending spur lines in different

directions, without ensuring that the trunk lines would be able to handle the increased traffic brought by the new lines.

By 1935, the government railways had a network of more than 17,000 route-km, but the Tokaido corridor (Tokyo–Yokohama–Nagoya–Kyoto–Osaka–Kobe) was still only a double-tracked line with insufficient capacity to match its central role. The insufficient capacity of this section had been a headache for government railways'

traffic managers as far back as the 1920s, but stagnant demand in the 1930s meant that nothing had been done to address the problem.

Passengers and freight increased dramatically in the second half of the 1930s, and the government railways found itself with a more favourable balance sheet. This prompted the 1939 decision to construct a new standard-gauge (existing lines were narrow gauge) double-tracked

**Table 3 Income and Expenses of Government Railways (subsequently JNR) (1926–86)**

Fiscal Year	(1) Operating income	(2) Operating expenses	(3) Operating profit/loss	(4) Operating ratio (2)/(1) x 100	Fiscal Year	(1) Operating income	(2) Operating expenses	(3) Operating profit/loss	(4) Operating ratio (2)/(1) x 100
	(¥1 million)	(¥1 million)	(¥1 million)			(¥100 million)	(¥100 million)	(¥100 million)	
1926	484.1	342.0	142.1	70.6	56	2,879	3,040	-162	105.6
27	506.4	356.6	149.8	70.4	57	3,339	3,182	157	95.3
28	529.1	381.3	147.9	72.1	58	3,358	3,331	28	99.2
29	517.8	387.1	130.7	74.8	59	3,678	3,650	28	99.2
30	458.1	371.1	87.1	81.0	60	4,075	3,993	82	98.0
31	433.5	354.5	79.0	81.8	61	5,054	4,588	466	90.8
32	426.0	354.0	72.0	83.1	62	5,291	4,775	516	90.3
33	473.6	376.0	97.6	79.4	63	5,687	5,144	543	90.4
34	518.7	405.9	112.8	78.3	64	6,002	6,326	-323	105.4
35	544.5	423.3	121.2	77.7	65	6,341	7,571	-1,230	119.4
36	598.2	437.6	160.5	73.2	66	7,939	8,547	-608	107.7
37	670.2	490.5	179.7	73.2	67	8,561	9,508	-947	111.1
38	768.9	554.1	214.8	72.1	68	9,165	10,526	-1,361	114.8
39	924.4	636.7	287.7	68.9	69	10,440	11,763	-1,323	112.7
40	1,039.5	749.3	290.2	72.1	70	11,457	13,006	-1,549	113.5
41	1,122.8	864.1	258.5	77.0	71	11,782	14,207	-2,426	120.6
42	1,441.9	994.8	447.2	67.0	72	12,443	15,944	-3,501	128.1
43	1,711.7	1,180.0	531.7	68.9	73	13,791	18,407	-4,617	133.5
44	1,865.1	1,499.1	366.0	80.4	74	15,714	22,329	-6,615	142.1
45	2,227.8	2,932.3	-704.4	131.6	75	18,209	27,444	-9,235	150.7
46	5,844.0	9,871.3	-4,027.3	168.9	76	19,931	29,156	-9,225	146.3
	(¥100 million)	(¥100 million)	(¥100 million)		77	23,690	32,147	-8,457	135.7
47	273.5	406.7	-133.2	148.7	78	25,702	34,714	-9,012	135.1
48	721.7	1,033.0	-311.3	143.1	79	29,021	37,446	-8,425	129.0
49	1,116.6	1,152.2	-35.6	103.2	80	29,637	39,643	-10,006	133.8
50	1,431.8	1,401.1	30.8	97.9	81	31,730	43,254	-11,524	136.3
51	1,839	1,865	-26	101.4	82	33,130	47,749	-14,619	144.1
52	2,182	2,203	-21	101.0	83	32,989	51,401	-18,412	155.8
53	2,521	2,518	3	99.9	84	33,898	52,091	-18,193	153.7
54	2,527	2,563	-36	101.4	85	35,528	55,728	-20,201	156.9
55	2,630	2,814	-184	107.0	86	36,051	53,052	-17,002	147.2

Note: Operating expenses include interest on loans.

line linking Tokyo, Osaka, and Shimonoseki to accommodate trains running as fast as the technology of the day permitted. Construction began in 1941 but was abandoned in 1944. The line was to be called 'shinkansen' (meaning new trunk line) and the name was soon appropriated to the new Tokaido line from Tokyo to Osaka when it was decided to push forward again with construction in 1958.

During the decade following the defeat in 1945, there were no funds to continue building the shinkansen. As Table 3 shows, JNR was operating in the red, and the nation's finances were also on shaky ground. Postwar reconstruction brought an increase in transport demand, which boosted JNR's passenger and freight traffic to an all-time high in FY1955. If motor vehicle and air traffic levels had been as high then as they were 10 years later, and if the four-lane expressway between Tokyo and Kobe had opened earlier (rather than in 1969), there would have been no need for JNR to assume the tremendous debt caused by the westward extension of the shinkansen.

Unfortunately, motor vehicle and air transport capacity was 10 years too late to save the country from the expense of the shinkansen and during those 10 years, JNR pushed ahead with construction not only of the Tokyo–Osaka Tokaido Shinkansen, but also extension of the line westward from Osaka, and then to 1970s adoption of a plan to create a nationwide shinkansen network of 7000 route-km.

Table 2 shows that passenger-km on the JNR network increased until 1974, while freight generally increased from the mid-1950s to the peak in 1970, although there were slight declines in economic downturn years. The late 1960s marked a turning point for JNR, as passengers and freight shifted increasingly to roads and the air. Unfortunately for JNR, this shift occurred after the old shinkansen plan had been dusted off and implemented.

The shift away from rail began with freight.

Trucks carried more tonne-km than JNR for the first time in FY1966. Motor vehicles were carrying more people than JNR by FY1971, which was also the year that buses and cars started carrying more people than JNR and the private railways combined.

Japan of the 1960s saw rapid improvement in air transport capacity, with greater attention being given to airports and introduction of jet aircraft. As a result, passengers travelling between major cities at least 500-km apart began abandoning JNR for airplanes. If the airports serving Tokyo and Osaka had been able to accommodate even more passengers during this time, the Tokaido Shinkansen and Tokaido main line would have been in serious trouble.

From these trends, it is clear that if the shinkansen had not been built and opened in 1964, it would never have been built. Up until the mid-1950s, JNR did not have the funds to build the Tokaido Shinkansen and if it had waited until the end of the 1960s before deciding whether to launch the project, it would have questioned the need for constructing the new line. Instead, it probably would have added more double-tracked narrow-gauge sections to the high traffic-density areas. If the national railway had increased its capacity in the 1960s just by laying more narrow-gauge track, when the 1970s came and the Japanese realized that France was moving into the future with its TGV, they would have criticized JNR for not adopting new technologies and building Japan's own high-speed railway.

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### Worsening Conditions at JNR

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In addition to the opening of the Tokaido Shinkansen, 1964 was a milestone in another sense as well—it marked JNR's long decline into deficit. Years of political interference had placed it on a downward spiral from which it would never recover.

It is important to note that the deficits did not occur without warning—experts had seen them coming, and had strongly recommended raising fares, but the government insisted on regulating all public utilities, including JNR fares, in order to keep inflation at bay.

Inflation at this time was considerable with the consumer price index rising several percentage points each year. Train fares were increased in 1961, and another fare increase was needed in 1964 to compensate for rising costs. Moreover, railway revenues were being slashed by the growing popularity of road and air travel. In addition, it was anticipated that profits from traffic in the Tokaido corridor—the path of both the new Tokaido Shinkansen and the older Tokaido main line running parallel to it—would drop dramatically for 3 years after the 1964 shinkansen opening. Although the Tokaido corridor has the highest traffic density, profits fell sharply (from ¥61.7 billion in 1963 to ¥8.1 billion in 1965—a drop of more than ¥50 billion) because of the tremendous construction costs of the shinkansen. The San'yō Shinkansen, which was added to the San'yō main line running west from Osaka to Fukuoka, had a traffic density of just 40% of the Tokaido corridor. It was obvious that neither of these San'yō lines would be profitable, but construction of the San'yō Shinkansen was pushed ahead in the late 1960s with no careful consideration of its effect on the balance sheet.

The San'yō Shinkansen was opened in 1975 after a recession in the early 1970s was already having a negative effect on JNR revenues. If the JNR accounting system had not taken depreciation costs into effect, it would not have had a negative balance sheet in the 1960s, but its 1971 figures showed a deficit even before depreciation. It was around this time that the accumulating debts began putting tremendous pressure on the national railway network.

To sum up, the deficit in the first half of the



'Kodama' limited express (1958) passing Mt. Fuji  
(Transportation Museum)

1970s had three main origins: low fares, heavy investments, and accumulated debts. There were other causes too, particularly poor labour relations. For example, the union refused to go along with plans to raise productivity. Here it should be said that the workers could hardly be expected to submit to demands for more rational rules when the politicians, government and JNR managers themselves were not following rational policies. At that point in time, the general public was unaware that JNR was falling into a situation from which it would never be able to extricate itself. This was the fault of the politicians, who boosted their popularity by keeping fares low and calling for more and more investment, while repeating that the situation could be turned around.

Government plans assumed that demand for rail services would rise to levels much higher than JNR could ever achieve. Therefore, the government must accept its share of the blame for the problem.

By 1975, JNR's financial position was so precarious that the government allowed a fare increase. This relieved the debt burden somewhat, but not enough—and the

problem was compounded by continuing excessive investments. Eventually, by the beginning of the 1980s, the government came to the conclusion that the railway could never be put on a solid footing if it remained as a public corporation.

It appeared that the only solution was to break up JNR and privatize the parts. The creation of the JR group of companies, in April 1987, was an attempt to deal with a problem far larger than any experienced abroad. It was the result of the Japanese determination to finally come to grips with reality. The solution would have been the same even without the prevalence of a worldwide tendency in the late 1980s for privatization and 'clean sweep' policies.

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### Are Theory and Academic Advice Useful?

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I previously mentioned the transportation expert Seki Hajime's warning about infrastructure investments at the beginning of the 20th century. Although his admonition was based on transportation realities in France at that time, it is still good advice that every transportation policymaker should follow today.

Academics may predict that a certain outcome is inevitable unless policies are changed, but I do not know of one instance in the 20th century where their advice has been adopted and found truly useful.

When I joined the Ministry of Railways in 1941, there was a lot of research into how to coordinate use of the increasingly popular motor vehicle with railway traffic, for the benefit of both. The trend at the time was to regulate (control) transport, which caught on in the late 1960s as 'comprehensive transportation policy'.

But this policy lost credence in the 1980s when deregulation, which was being advocated abroad, came into favour in Japan. Actual examples showing how aspects of the economic order of things could be radically altered carried more weight than theory.

In the 20th-century, transportation policy discussions have mostly revolved around whether or how fares should be regulated and around the relative advantages of a publicly owned, publicly run transportation system, as opposed to a system owned and operated by the private sector. Deregulation was one focus of these discussions. Insights gained through these discussions helped to explain the current state of railways, but did not indicate how the situation could be improved.

I carefully studied transportation papers written by academics at the time, hoping to find useful suggestions—I found nothing. Actually, this is not surprising because most academic research at the time was based on the assumption that politicians, governments, companies and labour unions never acted irrationally; that politicians had the interest of the people at heart; that managers were keen to maintain corporate profits; and that politicians and transport managers would do everything they could to promote efficient management (within legal limits). Those academics never considered a scenario in which JNR would be forced to keep fares low and to make investments that would plunge it deep into the red.

Also, no matter how carefully experts may examine a problem, they cannot see even 1 day into the future—no researcher has perfect foresight. And even if an expert in economic theory joined forces with a civil engineer, and the two of them discovered a complex formula that would work in theory, that formula could not be applied to tomorrow's changing conditions. In other words, numerical values based on theory are not accurate enough to be used when making decisions about the future.

In this context, the ideas of Georg Hegel, the German philosopher, have often seemed relevant to me over the last 50 years. In *Philosophy of Right* (1821) he wrote, 'Only one word more concerning the desire to teach the world what it ought to be. For such a purpose, philosophy at

least always comes too late’.

Like philosophy, transportation research and the social sciences ‘always come too late’. And my examination of the past shows that the results of academic research would not have helped solve JNR’s problems.

If I can add ‘only one word more’, specialists and critics in Japan tend to base their views on foreign case studies, rather than making their own analysis based on Japan’s situation. Consequently, they would not have been able to find a solution for JNR, because other countries had no public corporations where management responsibilities were so widely divided, nor did foreign national railways have to maintain their fares well below cost without receiving subsidies to compensate for the difference.

Needless to say, government officials and JNR management did their best to avoid criticism. They feared release of sensitive documents and controlled the flow of

information. As a result, it became difficult for even people on the inside to make accurate decisions, so JNR offered services for which it did not know the true cost.

The recent chaos in Japanese banking circles reminds me of the problems that plagued JNR. When the ‘smoke-screen’ balance sheets of The Long-Term Credit Bank of Japan became the subject of public criticism in June 1999, we learned from the *Yomiuri Shimbun* (17 June 1999) that as far back as 1995, the Director of the bank’s research institute wrote, ‘The intricate bureaucracy that pervades the bank has prevented proper disposition of our bad debts. If the bank attempts to dispose of its bad debts, its balance sheet will show red ink and stockholder dividends will have to be drastically cut, so our corporate bureaucrats will do everything they can to avoid their responsibilities.... Management should take steps to deal with the bad debt as soon as possible’. Needless to say, the

recommendation was ignored by the management!

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### Avoiding Problems Next Century

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In the 20th century, the dramatic advances in every sector were achieved mostly by trial and error. Although the world has changed tremendously, some things never change—fundamental standards on which we base our decisions, the basic principles of science and economics. We can take these unchanging elements into consideration when predicting future change, and use them as a framework on which to base decisions about the future. In the case of transportation, the following factors will never change: infrastructure, vehicles (such as cars or boats), motive power, and systems to regulate transport.

As the speed of the vehicle increases, these four factors will become ever more interdependent. One good case is the MAGLEV linear motor car, which has been under development since the 1960s—for this very fast means of transportation, the route, the vehicle and the motive power are all designed to meet the unique requirements of MAGLEV technology.

And in economics, there is a very simple rule—you cannot continue to provide a service if expenditures remain greater than your income. MAGLEV technology is now being tested, but it can only be put into practice if construction costs, including the heavy expense of purchasing land and constructing tunnels, can be kept within reasonable limits. It is quite unlikely that this could be done for the MAGLEV line proposed between Tokyo and Osaka.

Other qualities that are always required of a transportation system are: good safety, environment-friendliness, high speed, inexpensive operation (or at least reasonably so), and good comfort. Such qualities have always been considered important, even in the 19th century.



Series 0 EMU leaving Tokyo Station soon after opening of Tokaido Shinkansen (Transportation Museum)



JR Central and JR West Series 700 EMU (1997) used for Tokaido and San’yo Shinkansen ‘Nozomi’ services (S. Kubo)

Which qualities to emphasize depends on circumstances, but none can be ignored. In the case of the shinkansen, rolling stock size must be balanced against speed; and speed must be balanced against comfort and environmental considerations. Commonly, engineers try to find a compromise between all these qualities. As one example, in 1999, the maximum operating speed for new shinkansen rolling stock was lowered from 300 to 285 km/h in order to increase ride comfort and reduce external noise. The new cars are a big hit with passengers, showing that compromises can be made to satisfy both passengers and people living close to the tracks.

But we must not forget to consider the law of diminishing marginal utility when deciding which quality to promote over others. And we must also realize that any attempt to improve one aspect will involve greater cost.

Based on the technological developments of the previous century, the 20th century has made tremendous advances in the transportation by land, sea and air. Modern transportation has promoted economic development and population growth. Transit systems capable of carrying vast numbers of commuters have given birth to an entirely new phenomenon—the metropolis. But our modern transportation systems cannot consume more than the limited amount of resources available to them, and they must be safe and keep to environmental standards.

More than anything else, transportation infrastructure requires sufficient space. In the case of the Tokyo–Osaka corridor, nearly all the available land has already been occupied. In these two cities and elsewhere, commuters want less crowded transit systems, but there is no available land to build the necessary infrastructure. The same problem is seen at airports too. Capital imposes another limitation. While transportation has contributed to Japan's economic development, it has also

produced negative results—JNR's debt, which mushroomed in the late 20th century. Japan's financial resources are limited, and this debt seriously hampers transport infrastructure investments in the 21st century.

Before investing, it is important to carefully analyze whether the final benefit justifies the total cost. If analysis shows that a company would lose money on an undertaking but the social benefits justify the cost, it could be argued that the government should participate in the investment. However, such an analysis cannot be definitive, because it would be based partly on assumptions about the future. For example, there is no guarantee that taxpayers would be willing to pay for a large revenue shortfall, and investors might not necessarily feel confident that the government would keep its promise to pay subsidies. There could be other unforeseen problems too—demand might fall below expectations, and costs could balloon for one reason or another.

Japan's present financial resources leave little room for manoeuvring. But some transportation experts and planners are still calling for the type of massive investments that were made in the past, despite the fact that there is not enough money to solve even Tokyo's commuter problems. And some people continue to demand more shinkansen routes and expressways in areas where traffic densities can never justify their construction.

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### Rail and Road

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The time to curtail ambitious plans to expand the shinkansen and expressway networks is now, because further investment will without doubt lead to further debt. It is said that the Japan Highway Public Corporation (NDK), which operates the nation's expressways, could become a second debt-ridden 'millstone round the nation's neck' like the now-

defunct JNR. Huge amounts of money are involved in expressway expansion and JR rail networks, so I will discuss these plans separately.

Expressway plans call for the construction of access-controlled roads to link all the nation's major cities, creating a high-speed road network of about 14,000 km (with expressways occupying about 11,500 km of this total). By the end of FY1999, about 7548 km are expected to be in operation. The following passage from the June 1999 issue of *Expressways and Automobiles* states that 'FY1997 expressway revenues were satisfactory, with ¥57 spent for every ¥100 earned. This compares very favourably with JNR figures for 1986, the last full year of operations when JNR was spending ¥147 for every ¥100 earned. If the total loans outstanding at the end of FY1997 for traffic-bearing expressways is divided by the amount of principal to be repaid annually, the loan repayment will take about 23 years'.

This may be so, but there are two reasons why we must be careful when comparing the financial situations of NDK and JNR. First, the accounting procedures of these two bodies are different—it is wrong to make simple comparison between the expressways' expense-to-revenue ratio and JNR's business coefficient. For the railway, a business coefficient between 90 and 95 represented a maximum, and fares and investments were to be calculated so that results did not fall below this limit.

Second, the years selected for comparison are a poor choice because they do not represent the same stage of development. In the case of the NDK, all expressways opened to traffic over the last 10 years are operating in the red, but the shortfall is made up through revenues from other, more profitable routes—this situation resembles that of JNR around 1960 (Table 3).

NDK's use of internal cross subsidy has reached a limit, just as JNR reached its limit in the early 1960s. There are legitimate

concerns that NDK will not be able to recover if it falls into red. If a company continues to invest in money-losing projects, one certainly cannot assume that, just because its current balance sheet looks good, its future is secure. The following

editorial from the *Asahi Shimbun* (29 December 1998), makes this same point: 'What must be done to ensure that the NDK does not become another debt-ridden millstone round the nation's neck, like JNR? 'It is time to rethink plans that envision

11,500 km of expressways stretching throughout the country by the early part of the 21st century. Those plans were drawn up around 1987, when Japan was experiencing a bubble economy. The financial situation is entirely different today.

'Financial resources are limited. Now is not the time to push ahead with highway building, plus shinkansen track laying, plus airport construction. Rather, policymakers must decide which of these transport modes should be given priority within the entire transportation system.

'And when it comes to roads, should we place priority on building more local roads, or strengthening the nation's expressway network? And is it really a good idea to use tax revenues earned through motor traffic mainly for national and local highways, as we do now? These are some questions to be looked at closely'.

To return to railways, how healthy is the JR Group at present? The three JRs on Honshu: JR East, JR Central, and JR West, are still not completely private because the government holds some shares. This situation will change, and the companies will probably continue to enjoy a favourable financial position, assuming, of course, that the government does not make unreasonable demands. However, some loss-making lines may have to be abandoned.

The other companies within the JR Group—JR Hokkaido, JR Shikoku, JR Kyushu, and JR Freight—are supposed to be privatized in 2001 but the government has yet to spell out how it will do this. These three smaller passenger railways are barely making ends meet, while JR Freight has been losing money since 1993. As a result, there is little chance that the public will be interested in buying shares in these companies.

The financial position of these four companies is also threatened by plans to expand the shinkansen network. If new shinkansen are built in areas where

**Table 4 Passengers and Freight in Japan, Britain and France by Transportation Mode**

Passenger		(Units: 100 million passenger-km)	
Country	Type	Year	
		1965	1995
		(%)	(%)
Japan	JNR/JR	1,740 ( 45)	2,490 ( 21)
	Private railways	815 ( 21)	1,511 ( 13)
	Buses	801 ( 21)	973 ( 8)
	Motor vehicles	406 ( 11)	6,085 ( 52)
	Coastal shipping	34 ( 1)	55 ( —)
	Domestic airlines	30 ( 1)	650 ( 6)
	Total	3,826 (100)	11,764 (100)
Britain	Railways	349 ( 10)	369 ( 6)
	Roads - Public transport	630 ( 19)	430 ( 6)
	- Private motor vehicles	2,330 ( 70)	5,940 ( 87)
	Airlines	16 ( —)	60 ( 1)
	Total	3,325 (100)	6,799 (100)
France	SNCF	383 ( —)	553 ( 7.2)
	Motor vehicles	—	7,050 ( 91.6)
	Airlines	5.2 ( —)	93 ( 1.2)
	Total	—	7,696 (100)

  

Freight		(Units: 100 million tonne-km)	
Country	Type	Year	
		1965	1995
		(%)	(%)
Japan	JNR/JR	558 ( 30)	247 ( 4)
	Private railways	9 ( —)	4 ( —)
	Motor vehicles	484 ( 26)	2,926 ( 53)
	Coastal shipping	806 ( 43)	2,383 ( 43)
	Domestic airlines	— ( —)	9 ( —)
	Total	1,857 (100)	5,569 (100)
Britain	Railways	252 ( 21)	133 ( 6)
	Roads	688 ( 57)	1,496 ( 66)
	Coastal shipping (petroleum-related)	250 ( 21)	314 ( 14)
	Coastal shipping (other)	2 ( —)	212 ( 9)
	Pipelines	13 ( 1)	122 ( 5)
	Total	1,206 (100)	2,277 (100)
France	Railways	646 ( 44)	498 ( 24)
	Roads	540 ( 37)	1,320 ( 63)
	Inland waterways	125 ( 9)	59 ( 3)
	Airlines	2 ( —)	9 ( —)
	Pipelines	151 ( 10)	223 ( 10)
	Total	1,464 (100)	2,109 (100)

Note: Statistical data for each country are based on slightly different criteria.  
(Railway Statistics 1998, Japan Transport Economics Research Center)

transportation capacity is already sufficient, the railways' burden will rise dramatically. This is true whether the new lines are so-called mini-shinkansen or standard shinkansen. And even if it is decided that the cost should be paid through taxes, the government will probably ask the JRs to pay part as well.

If new shinkansen lines with standard gauge come into operation, freight transport may find itself with fewer narrow-gauge sections to operate. For example, when shinkansen trains begin running between Morioka and Aomori in northern Japan, freight trains will have to use narrow-gauge track operated by a non-JR company. If, under the same principles, the shinkansen to be built from Honshu to Hokkaido uses a standard-gauge track, narrow-gauge freight trains will no longer be able to use the undersea Seikan Tunnel. Needless to say, unlike years ago, freight wagons will never be carried across the Tsugaru Strait by ferry again. In other words, there is a risk that freight will one day no longer travel by rail between Honshu and Hokkaido.

Although one could justify the use of public money to subsidize passenger services, subsidies could never be justified for freight services. JR Freight has run a deficit for the last 6 years, and will soon be enmeshed in inescapable debt if the present trend is allowed to continue. If that occurs, the company will go under. To prevent this scenario, unprofitable freight services must be abandoned soon, leaving only services now operating in the black.

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## Conclusion

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Everyone who looks ahead to the 21st century is excited about the benefits new technology will bring. Unfortunately, as I mentioned before, MAGLEV technology does not offer much hope in Japan. Supersonic aircraft may set a new standard in the air, but this technology offers little



*JR East Yamagata mini-shinkansen operating on 60-km extension from Yamagata to Shinjo*

*(JR East)*

potential for domestic travel in a small country like Japan. Consequently, new technology is unlikely to make major changes to Japan's transportation systems. As the final question, how will continued investment in transport infrastructure change Japan's transportation networks? The bridges on the three routes connecting Honshu to Shikoku have all been completed by May 1999, and now attention has turned to another plan—construction of a route connecting Shikoku and Kyushu. But this route would change traffic patterns very little.

Over the last 50 years, Japan has greatly expanded transport capacity and market share has changed from one mode to another. As shown in Table 4, railways in Japan have about 30% of the passenger

market when calculated in passenger-km terms. This is because Japan is a densely populated country. But the proportion for freight is very low, reflecting the fact that Japan, like Britain, is an island nation. Although market shares have changed greatly over the last 30 years, the current trends do not point to any great changes in the future. The movement of goods and people in Japan increased dramatically in the past, but the impetus is waning and I do not believe the 21st century will see great increases again. ■

### Note:

The family name is given first in Japanese names in this article.



### Ryohei Kakumoto

Dr. Kakumoto joined the Ministry of Railways in 1941 after graduating from the Faculty of Law at the University of Tokyo. He was a member of the JNR Audit Board and served as President of the Japan Transportation Economics Research Center. He was a visiting professor at Waseda University for many years, and has written a number of books on transport policy, urban transport, railway management, etc. He was an early advocate of JNR privatization in the late 1970s.