

tions in road financing have been considered during the past 5 years.

Tolling of roads, partly financed by loans taken out on the capital market by the state, has been implemented and, viewed in broad terms, has proved successful. Although the cost of toll collection has been higher than other methods of collection of funds, more efficient use has been made of resources and higher expenditure on roads has resulted.

The granting of concessions to private companies to finance, design, construct, maintain, and operate national roads and to collect tolls is also being considered. Although this will result in greater use of private-sector resources, there is a danger that the public may be exploited or alternatively that the private-sector companies may experience difficulties in the long run. The creation of a statutory body, with a large involvement by

the private sector, to provide certain needed and justified toll roads might well be a better solution to guard against possible exploitation of the public.

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New Thinking on Private-Sector Toll Roads in India: Rationale and Issues

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India's effort to involve the private sector in the provision of tolled roadways is outlined in this paper. Relevant provisions of the Seventh Five-Year Plan (1985–1990) and concerns of the private sector are discussed, and questions that remain to be resolved are summarized.

India has the fourth longest road network (1.7 million km) in the world (Table 1), about 0.8 million km of which are paved, but the unfinished tasks are stupendous: merely to connect by road all villages of 500 or more people by the year 2001 and to raise road density to 0.82 km/km² from the present 0.46 km/km², the length of the road network would have to be increased to 2.7 million km.

RATIONALE

Some of the many weaknesses of India's road system have been well summed up in the Seventh Five-Year Plan (1985–1990):

As much as 65 percent of the villages in the country are without an all-weather road. Only 47 percent of the road length in the country is provided with a proper surface. Besides, the pavement width of most of the road length is only single-lane. Even in respect of National Highways, 30 percent of the length has a single-lane road pavement. The grid as a whole suffers from serious deficiencies and there is a growing mismatch between traffic needs and available infrastructure, thus resulting in severe capacity constraints, delay, congestion, fuel wastage and higher vehicle-operating costs. It has been estimated that fuel wastage due to bad roads alone costs the country nearly Rs 5,000 million [as of October 28, 1986, the exchange rate was about U.S. \$1 = Rs 12.90] a year, the loss due to extra wear and tear of tyres, spare parts and other components being many times larger.

The task ahead is tremendous because, due to an acute resources crunch, investments sanctioned for roads in successive five-year plans are falling far short of requirements. For example, 600 bridges were needed on the national highways during the sixth plan period (1980–1985), but only 60 were included in the plan, and, in the first 3 years, only 9 were actually sanctioned. Because of cost escalations, the divergence between targets and physical achievements has become even wider (Table 2), and the adverse effects of poor and inadequate roads on the economy and on fuel consumption are becoming clear.

TABLE 1 COMPARISON OF SOME U.S. AND INDIAN STATISTICS

	Year	United States	India
Area (km ² 000s)	1984	9363	3288
Population (millions)	1984	237	736
Per capital gross national product (U.S. \$)	1984	15,390	260
Road length (km millions)	1982	6.36	1.55 ^a
Road density (km/km ²)	1982	0.68	0.47 ^b
Motor vehicles (millions)	1983	166.2	67 ^c

^aIn 1985 this value was 1.77.^bIn 1985 this value was 0.54.^cIn 1985 this value was 9.0.

TABLE 2 DEFICIENCIES AND SEVENTH FIVE-YEAR PLAN TARGETS

	Deficiencies as of April 1, 1985	Seventh Plan Target for March 31, 1990
Widening to two lanes (km)	5487	3500
Widening to four or six lanes (km)	1794	100
Bypasses (no.)	191	10
Major bridges (no.)	137	78
Minor bridges (no.)	1,587	600
Funds required (Rs millions)		
To clear all deficiencies		56,800
Seventh plan provision		8,920

Given the constraints on resources, it is not surprising that, as far as state-sector industrial investments are concerned, the entire Seventh Five-Year Plan is to be largely one of "consolidation." The development of infrastructure, which includes roads, is given high priority in the plan. Even so, the major thrust of the roads program during this period will be "to consolidate the gains so far achieved, properly maintain existing assets and initiate steps for upgradation and modernization

of the roads system." The expansion of capacity will thus admittedly fall far short of requirements, a fortiori, because compensating for poor past maintenance will preempt significant portions of allocations.

Winds of change are now blowing over the entire spectrum of economic and industrial policies. The opening of the hitherto highly controlled Indian economy has been considerably accelerated since the new government headed by Rajiv Gandhi took office in November 1984. As a result of a significant liberalization of the industrial licensing and other related economic policies, rapid expansion and technological upgrading are expected in all automobile- and vehicle-related industries. In the past, railway interests were apprehensive about increases in the road network and the growth of road transport industries (Tables 3 and 4). However, the investment plans of the railroads are under severe financial strain; the relative importance of the road transport industry will continue to grow, and a much more modern and much larger roads system will be needed.

The government has been quick to see the implications of these trends and has taken several policy initiatives. New investments in the public sector are to be restricted to those areas "where it alone can undertake projects requiring high investments and sophisticated and frontier areas of technology," and much greater responsibility for fulfilling plan objectives will be placed on the private sector.

The private sector in India has certainly come of age and has shown remarkable technological capabilities in complex areas and equally remarkable financial performance and promise. The promise is also displayed in the ability to attract vast resources from the Indian capital market. Confidence is being placed in the private sector not a day too soon. The roads development industry, like the railways, has for years been the exclusive preserve of the state sector, but the new confidence in the private sector has led the government to accept a suggestion made by a distinguished Indian industrialist:

It is possible that the Government sees the importance of good roads but due to constraints of resources—financial, technical and managerial—it is unable to translate all our

TABLE 3 ROAD-RAIL MODAL SHARE IN INDIA

Year	Passenger Kilometers (billions)			Freight Tonne Kilometers (billions)		
	Road	Rail	Total	Road	Rail	Total
1950–1951	23 (26)	67 (74)	90	5.5 (11)	44.1 (89)	49.6
1960–1961	57 (42)	78 (58)	135	35 (28)	88 (72)	123
1970–1971	169 (59)	118 (41)	287	66 (34)	127 (66)	193
1973–1974	208 (60)	136 (40)	344	67 (35)	122 (65)	189
1976–1977	235 (59)	164 (41)	399	76 (33)	157 (67)	233
1977–1978	250 (59)	177 (41)	427	77 (32)	163 (68)	240
1978–1979	270 (59)	193 (42)	463	81 (34)	155 (66)	236
1981–1982	N.A. (69)	N.A. (31)	N.A.	N.A. (49)	N.A. (51)	N.A.
2000–2001 (projections)	N.A. (73)	N.A. (27)	N.A.	N.A. (56)	N.A. (44)	N.A.

NOTE: Figures in parentheses are the percentage share of road and rail. N.A. = not available.

TABLE 4 GROWTH OF INDIAN ROAD NETWORK AND VEHICLE POPULATION

Road Length			Vehicle Population (000s)				Index for Total in (7) (1951=100) (8)
Year (1)	100 km (2)	Index (1951=100) (3)	Two Wheelers and Other (4)	Cars, Jeeps, and Taxis (5)	Trucks and Buses (6)	All Vehicles (4)+(5)+(6) (7)	
1951	400	100	31	159	116	306	100
1961	524	131	130	310	224	664	217
1971	918	230	746	682	436	1,865	609
1975	1215	304	1,257	766	449	2,472	808
1980	1492	373	2,847	1,054	612	4,514	1,475
1982	1546	387	3,885	1,207	751	5,844	1,910
1985 ^a	1772	443	6,506	1,517	952	8,975	2,933

^aFigures for 1985 are provisional.

dreams into action. If this be so, I wonder why the Government does not consider requesting private sector companies to supplement its own plans. Such companies could construct good roads and maintain them, if they are allowed to charge a mutually agreed toll for a specified number of years.

ISSUES

Tolls have been neither unknown nor unacceptable to the government in the past. On several bridges on the national highways, tolls have been an accepted practice for a number of years. However, the enormous need for the construction of new roads and the increasing difficulties faced in the proper maintenance of the existing road system both called for some new thinking. This is now reflected in the government's keenness to invite the private sector to participate in the road industry. The invitation is contained in a new policy statement, entitled *General Information on the National Highway System and Schemes for Private Sector Participation*, that was issued by the government of India in July 1985 after informal consultations with some concerned and experienced interests. The government has assured that necessary enabling legislation will be introduced and has even invited entrepreneurs to specify the provisions that need to be incorporated in such legislation.

Implementation of the policy is likely to bring to light quite a few issues about which decisions will have to be made to ensure concrete public response to this initiative. Some of these are

1. On what terms should land be made available by the government?
2. Should projects, such as building of roads, bypasses, tunnels, and bridges, be identified by the private-sector party, or should they be specified by the government? The government has listed some projects in the policy statement but has hastened to add that "the list is by no means exhaustive" and that "the private entrepreneur is free to identify the project, design its elements, raise funds, construct the facility, maintain the facility and collect tolls."
3. Should tolls be allowed for an unlimited period or for only a specified period, say, until investment costs are recovered?

4. Because new roads open up new geographic areas for industrial development, should the government in some way offer to underwrite the recovery of the initial costs of investment?

5. What type of private-sector entrepreneur should be permitted? Should such parties be required to be public limited companies, or could an individual entrepreneur also be given the task? If the former, should there be financial participation by the government or by the state-owned financial institutions? Should their nominees be on the board to safeguard the public interest?

6. What should be the scope for foreign collaboration or for participation of foreign firms in this industry? According to present official thinking, this "is not ruled out."

7. Should toll-financed schemes be allowed for potential monopoly routes where no alternative toll-free facility is available to the general public? The policy statement does not favor this, and in one such case in South India where there was no toll-free alternative, public reaction was sharp.

8. What principles should govern toll pricing? Experience in Europe, Japan, and the United States suggests several principles, and a study will be educational. Probably different principles will have to be applied in different cases. Apart from principles, such practical considerations as (a) the period for which tolls are to be allowed, (b) the costs of and the machinery for collections, and (c) allowance for inflation may also be important factors in deciding the actual toll in specific cases.

The government's initiative and invitation to the private sector to participate in the roads development industry is compelling, innovative, and timely. It deserves a constructive and generous response from the private sector. The road transport industry has been an excellent and faithful tax-gatherer for the government. Its accelerated growth in the coming decade and the awareness that this growth cannot be sustained without a matching roads network, also augurs well for the success of this initiative.

Since the announcements were made, several Indian private-sector units and their associations have held discussions among themselves and with the government to examine the ramifications and clarify their understanding; many foreign companies have also shown interest in participating.

Unfortunately, translation of the policy initiatives into action

has been slow. Firm offers from Indian parties were received for only two projects. It appears that some gaps between official and industry viewpoints have come to light. For example, prospective entrepreneurs would like their road construction projects to be treated on a par with other industrial projects that qualify for financial assistance from the state-owned financial institutions, whereas the government would like financing of road projects to be done by private entrepreneurs from their own resources or from open market borrowings and equity flotations. Other subjects under discussion include governmental participation in these projects, foreign collaborations, import of equipment, and tax concessions including accelerated depreciation. It is hoped that differences

will be eventually ironed out and that this unique experiment will be a success.

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The Toll Ring in Bergen, Norway

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This paper is about the recently opened toll ring around Bergen, Norway. The physical characteristics of the toll ring—toll stations, methods of payment, reserved lanes, and control system—are described. The toll ring is successful because it was introduced to raise funds for badly needed major improvements to the road system not to restrain traffic.

On January 2, 1986, the city of Bergen implemented a toll ring around the central business district (CBD). The Bergen toll ring and the Area License Scheme in Singapore are the only examples known to this author of vehicles being charged a toll for entering the CBD. Similar schemes have previously been proposed and considered in several cities as a measure of traffic restraint. Implementation, however, has usually been found unfeasible, mainly because of lack of public and political support.

Using some kind of road-pricing scheme to restrain traffic in the presence of severe congestion has been advocated on the grounds that it may be a better alternative than heavy investments in road capacity or continued congestion. Economists have also pointed out that this may bring the private cost of using scarce road space more in line with the social cost. The toll ring in Bergen, however, was introduced to help finance a major program of road construction, and traffic diversion is not considered an objective.

BACKGROUND

Bergen is situated on the western coast of Norway (Figure 1). It is the second largest town in Norway with a population of 200,000. Including the surrounding municipalities, the Bergen area has a population of 250,000.

Bergen has for centuries been a center of coastal trade, but its role as a trade center has been diminishing, in part because of better land-based communications and the declining importance of the Norwegian fishing industries. In recent years the economy of the Bergen area has gained from the northward movement of oil explorations on the Norwegian continental shelf.

The city of Bergen, a separate municipality within the county of Hordaland, is situated on a mountainous peninsula and is often called the city between the seven mountains. The topography concentrates the built-up area in certain corridors. Compared with many other cities of similar size, a large share of the population has been living in the central area, but in the last 10 to 20 years there has been a marked outward movement of population. Another consequence of the topography is that the cost of road construction is high and that vacant land that can be used for new roads is scarce in the central parts of the city.

Car ownership is below the national average, but in recent years the gap has been closing. At present car ownership in Bergen is about 320 cars per 1,000 population compared with a national average of 360.