

# The Role of Private Participation in Enhancing the Indian Transport Sector

by  
Nand Sharma

under the Supervision of  
Carl Martland

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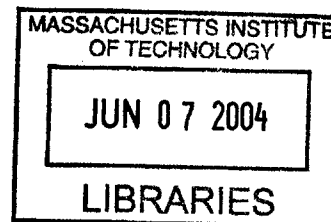
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Author .....  
Department of Civil and Environmental Engineering  
May, 2003

Certified by .....  
Carl Martland  
Senior Research Associate, Civil and Environmental Engineering  
Thesis Supervisor

Accepted by .....  
Oral Buyukozturk  
Chairman, Departmental Committee on Graduate Studies



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Submitted to the Department of Civil and Environmental Engineering on Feb 3<sup>rd</sup>, 2004,  
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## ***Abstract***

The Indian transport sector, one of the largest transport networks in the world, faces some serious issues. These may be identified as follows:

- Unmet demand for service and infrastructure
- Conflicting responsibilities
- Inadequate resource mobilization
- Poor Asset Management
- Inadequate imposition of accountability

Increasing the level of private participation in transport sector is one of the possible solutions to solve these problems. At present, private participation in the transport sector in India is low and generally restricted to small projects.

Although various steps have been taken to attract the private sector participation in transport sector in India, various indirect and direct constraints exist in its implementation. Indirect constraints include low economic growth, higher poverty rate and high population growth rate. The direct constraints include planning and the institutional issues, methodological or procedural issues, financial constraints, social and the political constraints.

In order to alleviate these constraints various steps can be taken. At the planning and the institutional level, India needs to develop a strategic planning network. At the legal and the regulatory level, there is a need for well-drafted laws and regulations related to private sector participation. Also, the amount of government support needs to be clearly defined for the toll road projects in India. Traffic forecasting techniques should be improved, and the government should promote public acceptance for private participation in transport sector.

Thesis Supervisor Carl D. Martland  
Senior Research Associate and Lecturer,  
Civil and Environmental Engineering



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Also I would like to thank my friends and classmates in having a wonderful time at MIT together. I wish best of luck to all of us.



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# *Chapter 1*

## *Introduction*

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### **1.1 Motivation of the Research**

India, the eighth largest country in the world, has one of the largest transport networks in the world. The transport sector is in the developing stage and has some constraints and issues to be dealt with. The government and the involved agencies are looking for different ways to improve the sector. One of the possible solutions in improving the transport sector is the participation of the private sector.

Private participation in infrastructure has been increasing in the last few years and has provided some solutions to the major transport problems. There have been instances where private participation has been successful in India. However, the level of private participation remains very low in the transport sector in India, especially when compared to countries like the United States.

### **1.2 Thesis Hypotheses and the Methodology**

The main hypothesis of this research is that greater participation of the private sector is desirable to improve the transport sector in India. More specifically:

- Transportation Infrastructure in India suffers from inefficiency and other problems.
- Greater private sector participation is a solution to some of the problems in India.
- The private sector participation is very low in transport sector in India.
- More extensive implementation of the public private partnerships is likely to ensure the better performance of the transportation industry in India.



- There is a good environment for the private sector participation in terms of economic, financial, administrative, legal and political issues, once relevant reforms take place in these areas.

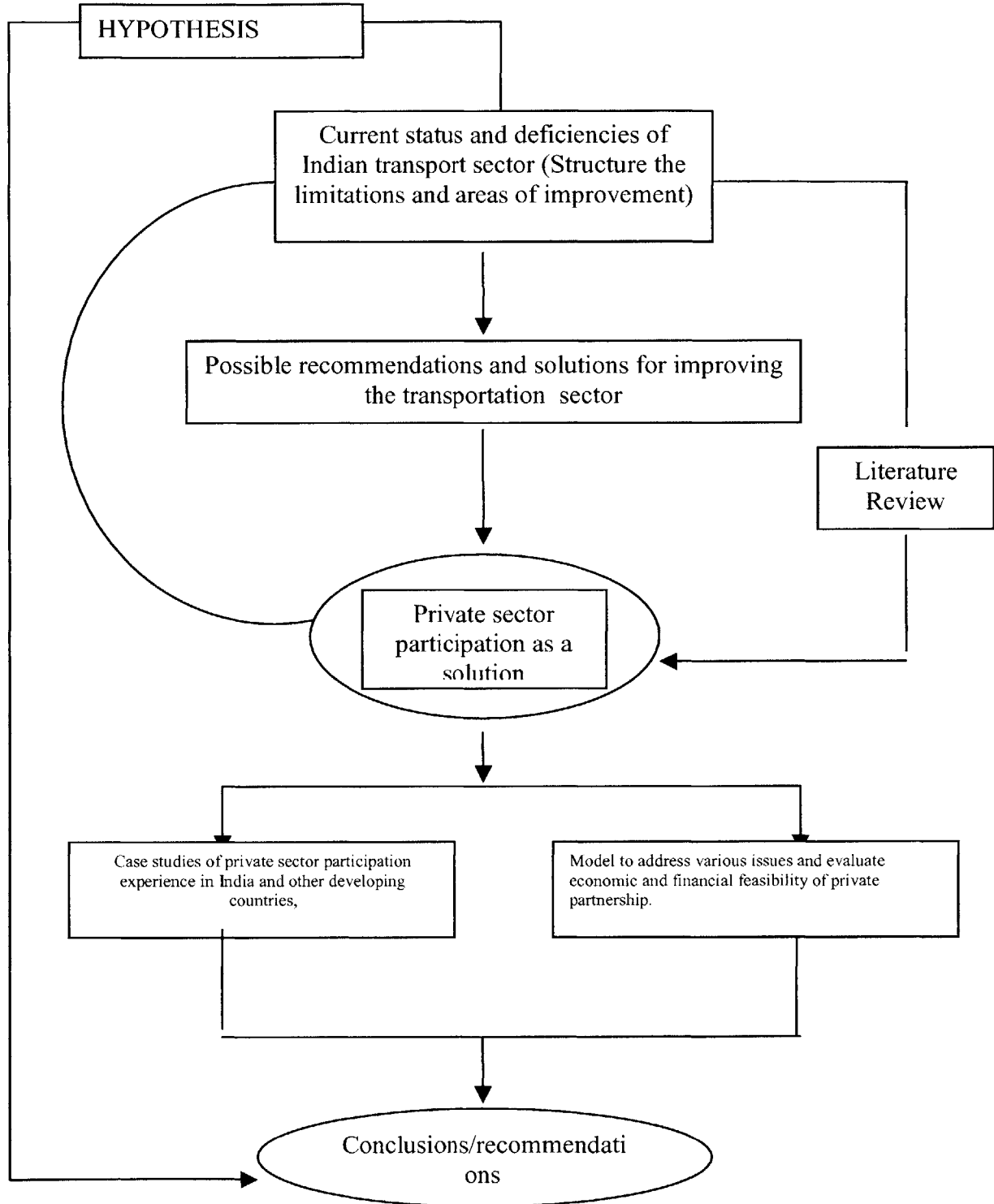
### *Methodology-*

The methodology adopted is as follows:

1. Document the current situation of the transportation system in India and identify the main problems and features of the transportation system in India.
2. Conduct a literature review concerning the benefits of and obstacles to private sector participation in transportation projects in developing countries.
3. Depict various examples/cases where private sector has been involved in transport projects in India.
4. Identify the economic, financial, legal, administrative and political issues related to involvement of the private sector in terms of economic, financial, legal, administrative and political.
5. Form a model that addresses the various issues and helps in evaluating the economic and financial feasibility of public-private partnerships.
6. Draw conclusions concerning the potential for greater private sector participation in transportation projects in India.

Figure 1.1 describes the methodology involved and provides an outline to the thesis.

**Figure 1.1 Methodology**



### **1.3 Structure of the report**

The first chapter gives a general background and identifies the major issues and the constraints of the transport sector of India. The chapter recognizes various institutional and the sectoral problems and also discusses the reforms that have taken place in the past. The hypothesis and the methodology involved for the study have been presented in the chapter.

The second chapter is the literature review. It identifies the driving forces behind the need of the private sector participation in transport and also the various challenges and the constraints in its implementation. The chapter also helps in identifying some of the economic, financial and the legal issues involved in the private sector participation.

The third chapter discusses the effects of the inefficient transport sector on the economy of India. It also presents the various reforms, which have taken place in the past, and various lessons learnt from these experiences.

The fourth chapter consists of four country studies and two case studies. The country studies present the various issues and advantages of private sector participation in toll financing in these countries. The case studies of Bandra-Worli Sea Link and Airoli Bridge provide clear examples where private sector participation has been successful in India. Also the case studies help to identify the present status of India with regard to private sector participation in the transport sector.

Chapter 5 presents a model to evaluate the economic and financial feasibility of private sector participation in transport projects. The chapter also identifies the various constraints-political, financial, methodological and regulatory in the implementation of the private sector participation.

Chapter 6 presents the conclusion of the study and provides various recommendations for the private sector participation in Transport sector in India.

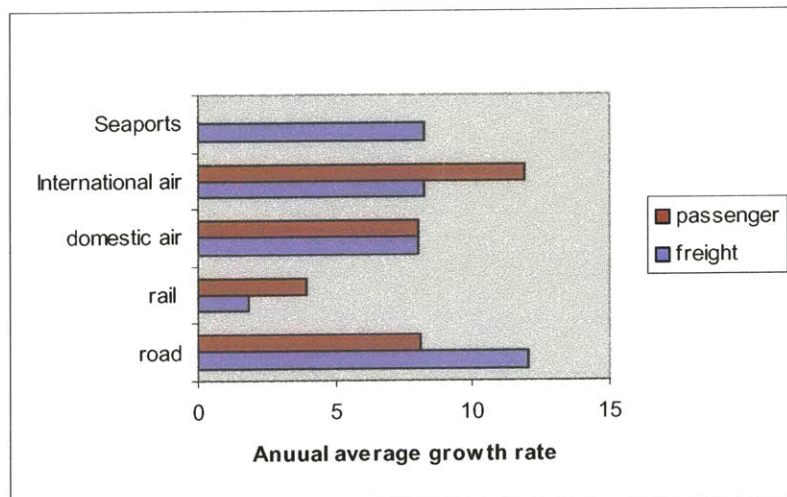
## 1.4 Transport Sector in India

### 1.4.1 General

India's transportation system is one of the largest in the world serving a land area of about 3.3 million square Km and a population of about 1 billion. It has been one of the major factors in determining the economic growth of the country. During the 1990's, India's GDP grew by 6-7 percent while the transport demand grew by about 10% and the same is predicted for the next ten years (*Bansal et al, 2002*).

There is a major growth in demand in all sectors except the railroads, which is 1.4 % a year for freight and 3.6 % a year for passenger. According to Bansal et al, 2002, it has been seen that the middle-income group is demanding more speedy, comfortable, reliable, and safe services, which is evident by the increase of the road transport demand. Between 1994 and 2000, passenger demand for the premier services grew more than the total rail passenger demand (7.3 % vs. 4.2% a year for intercity rail, and 7.5% vs. 3.3% in suburban commuter rail; (*Indian Railway Statistics, 2001*). The following figure gives the Transport Demand growth in the 1990's.

**Figure 1.2 Transport Growth rate in India in 1990**



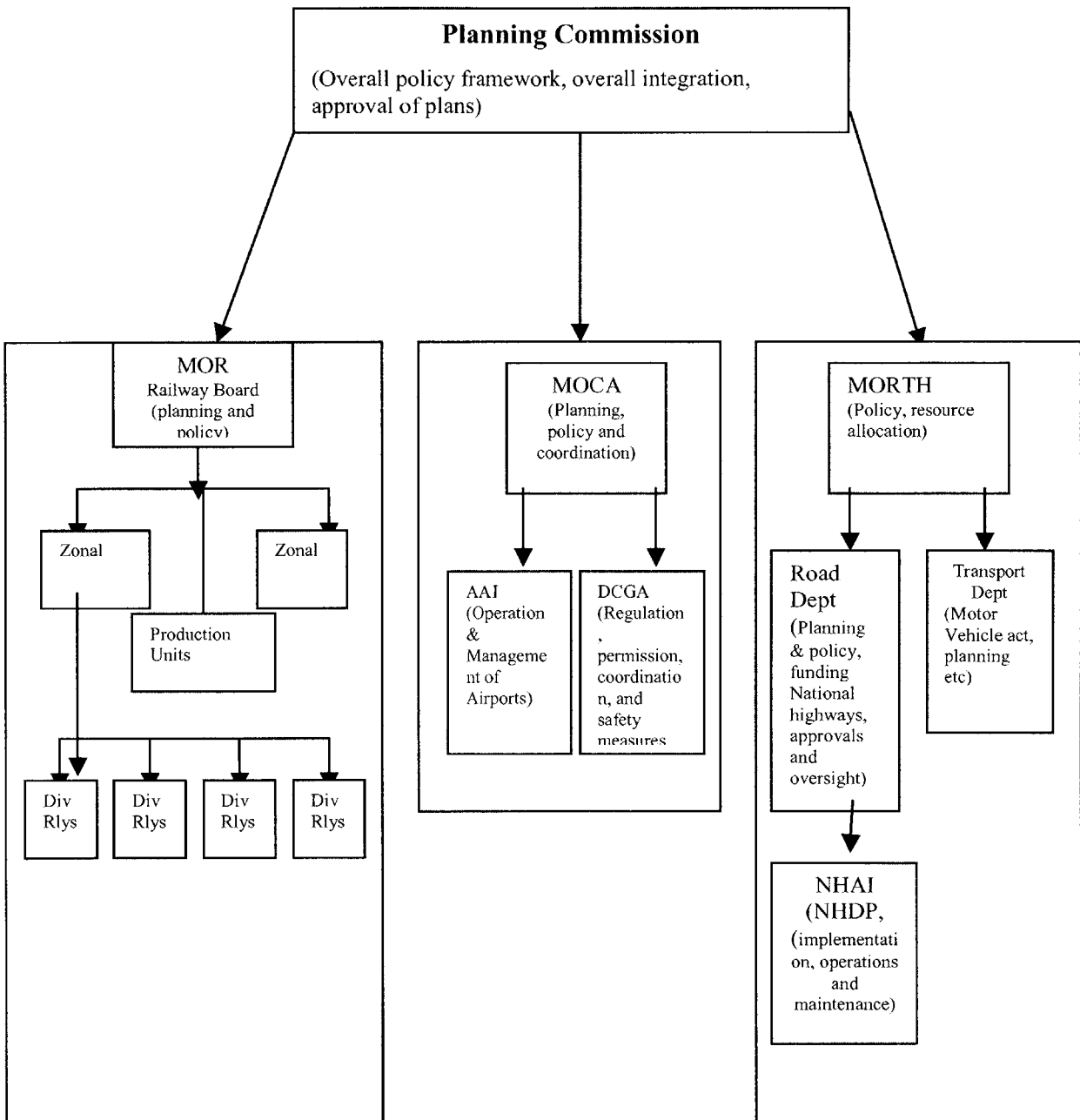
(Source: *Bansal et al, 2002*)

Several conclusions can be drawn from the above figure. The growth rate has been high for the road sector for both for the freight as well as the passenger traffic. This is due to the door-to-door convenience provided by the road sector. The increase in the traffic for the rail has been relatively low but has been increasing for the local and the domestic air travel.

#### *Institutional Ownership of the transport sector*

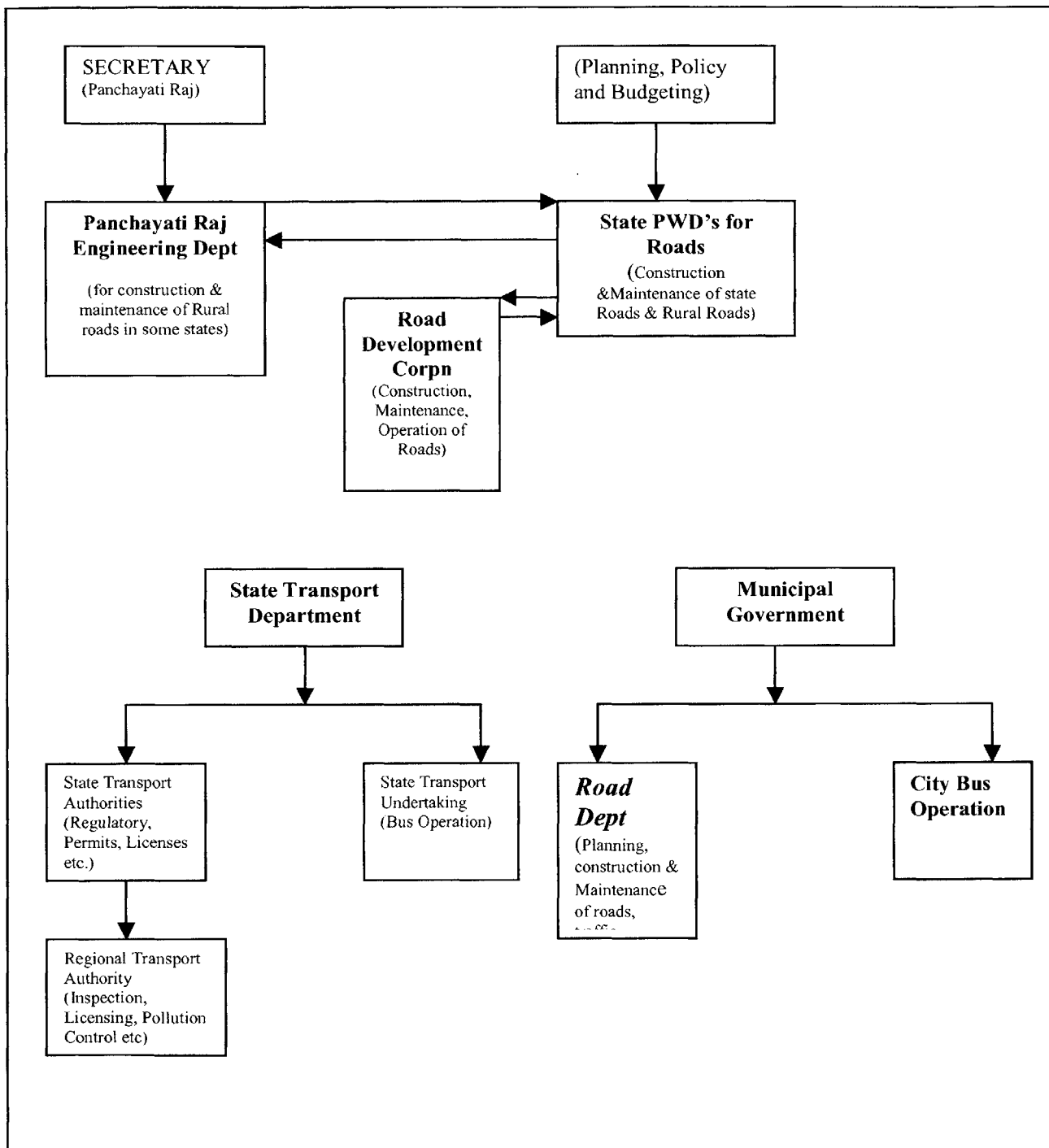
The institutional ownership is of the mixed nature. Both the public and the private sector participate in the development and the operation of transport services. The responsibilities for the transportation sector are divided between the Central and the State Government. There are various organizations at the state and the national level. Institutional arrangement at the Central and the State level are indicated in the charts 1.1 and 1.2.

**Figure 1.3 Institutional Arrangement at the Central Level**



MOR: Ministry of Railways  
 MOCA: Ministry of Civil Aviation  
 MORTH: Ministry of Road Transport and Highways  
 AAI: Airports Authority of India  
 DCGA: Director General of Civil Aviation  
 NHAI: National Highway Authority of India  
 (Source: World Bank: *The challenges Ahead*, 2002)

**Figure 1.4 Institutional Arrangement at the State Level**



*(Source: World Bank: The challenges Ahead, 2002)*



### 1.4.2 Road sector in India

India has one of the largest road networks in the world. The network in 2001 consisted of 3.2 million Kms (*Bansal et al, 2002*). The road sector can be divided into the following five sectors:

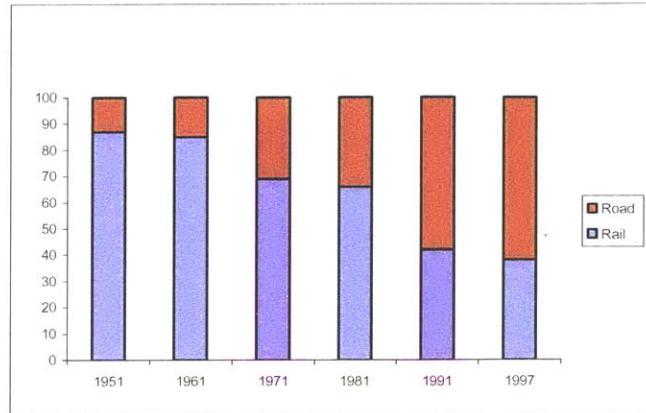
- National Highways
- State Highways
- Major District Roads
- Other District Roads
- Village Roads

The National Highways serve the purpose of transferring medium to long distance intercity passenger and freight traffic across the country. The State Highways carry the traffic from one state to the other. Major District Roads link the main roads and the rural roads. Other District Roads and the village roads provide accessibility to the villages to the nearby market places.

#### *1.4.2.1 Trend in the Road Traffic*

According to *Choudhary et al (2001)*, passenger traffic on the roads has increased from 23 billion passenger Km in 1951 to 1500 billion passenger Km in 1995. The freight traffic increased from 6 billion ton Km to 400 billion ton in the same period. According to the Ministry of Surface Transport (MOST), the long distance transport has shown a modal shift in India in the last couple of decades. In freight, the share of the road transport increased from 10% in 1951 to a little over 60% in 1996-1997. If the trend continues to remain the same, then the modal split would become increasingly skewed in favor of the road transport. The figure below gives the trend of the modal shift from the year 1951 to the year 1997.

**Figure 1.5 Modal Shift In freight Transport**



(Source: MOST 1996)

The following table provides the distribution of the network among the different types of roads.

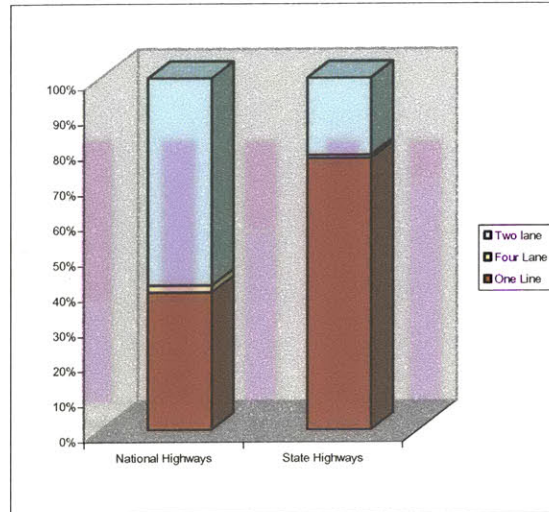
**Table 1.1 Different types of Roads in India**

Total Length	33,00,000
National Highways	52,000
State Highways	1,28,000
Major District Roads	4,70,000
Village and Other Roads	26,50,000

(Source: Choudhary et al, 2001)

It is important to note that while the National Highways constitute only about 2% of the total network, it carries about 40% of the total traffic (Choudhary et al, 2001). The composition of the National and the State Highways is indicated by the following figure.

**Figure 1.6 Composition of the National and the State Highways**



*Source: Bansal et al (2002)*

#### *1.4.2.2 Comparison of Road Sector with other Countries*

The geographic coverage of the highway network is almost to that of the United States (.66 Km per Square Km of the land area) and is much higher than China, Mexico and Brazil, which are 0.16, 0.16 and 0.20 respectively.

#### *1.4.2.3 Institutional Structure*

The responsibilities for the road sector are divided between the Ministry of Road Transport and Highways (MORTH) and the National Highways Authority of India (NHAI). Central Government of India is responsible for development, maintenance and management of National Highways under the provision of National Highways Act 1956 (*Bansal et al, 2002*)

The National Highway Act was amended in 1995 to permit the private sector participation. This Act empowers the Central Government to enter into agreement with any individual, partnership firm, company, joint venture, or any other legal firm for the development and maintenance of the highways. The Act also gives the provision of collecting fees from the users for the concession period. Once the concession period is

over, the right of collection of the fee is terminated and the facility gets transferred to the Central Government. The responsibility of deciding the policy for privatization of National Highways lies in the hand of the National Highways Authority of India. (Choudhary et al 2001)

#### 1.4.2.4 Key Issues facing the Road Sector

1. *Unmet Demand:* The road sector suffers from the issue of unmet demand. Although the road network is one of the largest in the world, it has not been able to meet the requirements of the growing traffic. During the last ten years, total transport demand has grown by ten percent annually with the highest demand being for the road sector. The populations of cars, buses and goods vehicles have grown with an annual growth rate of about 8.9 percent.
2. *Low Average speed:* Road Sector suffers from the problem of low average speed. The average speed on Indian Highways is about 45km/h, which is less than half of that in the United States. The commercial vehicles in India can commute only 250-300 kms in a single day as compared to 500-600 Kms in the developed countries (Choudhary et al, 2001).
3. *Maintenance:* This has been a serious issue for the road sector in India. Most roads in India have a bitumen pavement that has a low bearing capacity. This was chosen because high bearing capacity was not required. Due to the change in the automobile industry, larger sixteen wheeler trucks and combination vehicles are replacing the old six wheel trucks. This has led to the deterioration of road surface quality (Choudhary et al, 2001).
4. *Capacity:* Of the 182,000 kms of State and National highways, only one percent is four lanes and thirty four percent are two lanes while the rest still are one lane.

5. *High Accident rate:* An important aspect of the road sector is the safety issue. This has not integral to the design of the road sector. The accident rate is high as compared to other developed nations. The annual road safety toll is estimated at roughly 75,000 deaths that are about 10 times than the European Union.

### **1.4.3 Rail Sector in India**

Indian Railways (IR) is the largest rail network in Asia. It is the World's second largest network under one management<sup>1</sup>. The Indian Railways are fully owned and run by the government of India through the Ministry of Railways. Unlike the vast majority of railway systems, IR makes a profit and receives no subsidy from the government. Moreover, public service obligations discharged by the Indian Railways are not compensated by the government, which has larger implications for IR to work as an independent organization.

#### *1.4.3.1 Structure and Network*

IR is spread over 62,495 route-kilometers, which includes the broad gauge (1,676 mm), meter gauge (1000 mm) and narrow gauge (762 mm and 610 mm). The network serves more than 7,000 railway stations and the rolling stock fleet includes 8,300 locomotives, 39,000 coaching vehicles and 350,000 freight wagons<sup>2</sup>. IR is an organization that employs the maximum number of people (1.6 million) and it runs about 11,000 daily trains that includes 7,000 passenger trains (*Bansal et al, 2002*).

The freight traffic has increased from 93 million tons in 1950-51 to nearly 376 million tons in 1992-93, which is an increase of just over 300%. The passenger traffic increased from 1.28 billion passengers to 4.2 billion in the same period of time.

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<sup>1</sup> <http://www.indianrail.gov.in> -Indian Railways official website

<sup>2</sup> <http://www.indianrail.gov.in> -Indian Railways official website

Administratively, the Indian Railways are managed by the Railway Board, which represents the Ministry of Railways. The railway system is divided into 10 geographical zones for operations and Maintenance. These zones are again divided into smaller units such as the metro units. As the different zones have different political and social scenerios, there is an influence of regional political parties in the decision-making.

#### *1.4.3.2 Key Issues facing the Railway Sector*

Major Issues facing the Indian Railways can be categorized as follows<sup>3</sup>:

1. *Management and Coordination:* The administrative control of the railway sector is fragmented. The zonal responsibilities being different creates obstacles in the way of effective coordination. Each zone pursues policies from its own narrow perspective in isolation from the other. This situation results in wastage of resources as different zones compete for development funds for their own zone instead of pooling resources, information and expertise to gain maximum benefits and increased efficiency. There is no agency responsible for assessing inter-modal priorities or zonal needs and policies.
2. *Safety and security:* Railway safety is a neglected area as there is a need of more advanced network of information transfer. The railways face the issue of maintenance backlog and due to the insufficient maintenance of the rail tracks and rolling stocks; Indian Railways faces the threat of more rail accidents and train derailing. Unmanned railway crossing is one of major reason for the collision of train with buses and other transportation system which result in loss of human resources and property
3. *Capacity and Accessibility:* Indian railways suffer from the issue of unmet demand. There has been a heavy growth in the demand due to the increase in the population. Also more and more people from suburban area are moving to the

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<sup>3</sup> <http://www.indianrail.gov.in> -Indian Railways official website

cities for employment and business. This has paralyzed railway service in particular routes where travel demand is much more than the existing capacity of trains. This condition reflects an insufficient number of both trains and routes and a lack of resources for the expansion of the system.

4. *Technological Innovation*: It has been proved in the Indian context that the technological innovation has better future. The current policies and the structure inhibit the adoption of new technologies and the private sector participation should be promoted. Privatization of railways will bring competition among companies that will result in better services and lower fares. Indian railways need private sector participation in order to improve the service quality by adapting new technologies without conflicting with the existing system.
5. *Policy*: The overall policy framework has been unable to produce a modern and efficient transport sector. There is a lack of clarity regarding the participation of the private sector in the railway system. There is an absence of clear regulations and policies for effective partnership between the public and the private sector for the development and growth of the railway system in India.

#### **1.4.4 Airports Sector in India**

There are total of 449 airports in India<sup>5</sup>. The Airports Authority of India classifies the airports in India in the following manner:

1. International Airports: These are available for scheduled operations by the Indian and the foreign cargo.
2. Domestic Airports: These are further categorized as:
  - a). Customs Airport with limited International Operations.

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<sup>5</sup> Airports Authority of India; <http://civilaviation.nic.in/aai/airport.htm>

- b). Model Airports: These have minimum runway length of 7500 feet and adequate terminal capacity (400 passengers or more). These can also handle international traffic in limited cases.
3. Other Domestic Airports: These do not carry any international traffic and are 71 in number.
  4. Civil Enclaves in Defense Operation: These are twenty-eight in number out of which twenty are in operation.

The Airport Authority of India (AAI) manages airports. AAI is under the control of the central government. The two metropolitan cities- Delhi and Mumbai, handle about three-quarter of the total international traffic (*Bansal et al, 2002*). Due to the importance of these airports, the government is in the process of corporatizing these airports.

#### **1.4.5 Ports and Inland Waterways**

India has 12 major ports and 140 minor ports, mainly serving the foreign trade (*Bansal et al, 2002*). The tariffs at the major ports are regulated by the TAMP (Tariff Authority of Major Ports) and the minor ports are not regulated by the TAMP. In the year 2000-01, the major ports carried about 76% of the 368 metric tons of seaborne traffic (*Bansal, et al, 2002*). Inland Waterways in India is very limited. There are three major Waterways (the Ganga, the Brahmaputra, and the West coast canal, totaling 2,716 kms). The National Waterways Authority of India maintains these. The rest of the ports are maintained by the State Governments. (*Inland Water Authority of India, 2001*)

### **1.5 Major Problems with the Transport Sector**

In addition to the problems faced by the various sectors (road, rail and air), Indian transport system faces some underlying problems. The main problem, as identified by World Bank (*Bansal et al, 2002*), is promoting social and regional equity at the cost of



the economic efficiency. The transport sector has been perceived as a social rather than economic or commercial sector.

World Bank (*Bansal et al, 2002*) has identified four institutional problems, which arise because transport being perceived as a social sector. They are:

1. *Unclear and fragmented responsibilities*: This means that the sector responsibilities are not clearly assigned. This is made clear by an example of Indian Railways. Indian Railways is viewed as a social service meeting the social needs by providing cheaper fares to the passengers and is also expected to maintain its economic profitability. Box 1.1 makes clear the problems, which arise due to the conflicting responsibilities in the Railway sector.

**Box 1.1 Cross subsidies from freight to passenger services**

The conflicting responsibilities in the railway sector has led to the cross subsidies from the freight to the passenger service. This is because:

- Indian railways has been able to raise freight tariff faster than the increase in input cost but;
- The passenger fares have increased at the same rate as the input cost

This led to the increase in the freight tariffs much faster than the passenger fares. In 1998, the ratio of the passenger fare to the freight tariff fell to 0.32, which is among the world's lowest. The overall effect has been the diversion of the freight traffic to the roads and the drop of the rail freight traffic.

*(Source: World Bank, Bansal et al, 2002)*

2. *Inadequate Resource Mobilization*: The resource mobilization has not been adequate in order to maintain the existing infrastructure and to invest in the new ones. The transport sector gets finance from the following two sources:

- Direct/indirect charging of the transport users
- Levying taxes on the whole population

According to World Bank (*Bansal et al, 2002*), the transport sector face challenge of financing the sector. In India, the allocations of the funds to the transport sector (as a percentage of the GDP) have fallen in the recent years but have increased in absolute amounts. The amount of the costs recovered has not increased substantially.

According to the World Bank, it is important to have an adequate revenue stream from the users before mobilizing resources through the private sector. The problems that arise in the implementation of the transport sector are:

1. The lack of transparent regulatory framework.
2. Lack of risk allocation between the public and the private sector.
3. Absence of a strong revenue stream from the road users.

*3. Poor Asset/System Management:* The agencies responsible for managing the assets do not have proper procedures and tools for managing the assets. These problems arise because:

- Lack of information management system.
- Excessive focus on new assets rather than improving the old assets, which has a higher return on investment.
- Investment in assets with poor returns because of political interference and unjustified social considerations

*4. Inadequate Imposition of Accountability:* In India, there is established right to the taxpayers to have an access to the information yet according to the World Bank, certain things need to be in place in order to impose accountability:

- Right to relevant information.
- Presence of a regular reporting as a duty.
- Presence of an independent body to assess performance on behalf of public

## **1.6 Current Level of Private Participation in India**

This section describes the initiatives, which have been taken place in order to promote private participation in transport sector in India.

### **1.6.1 For Roads**

According to the *World Bank and Public-Private Infrastructure advisory Facility (2000)*, important points with regard to the private participation in the road sector is:

- Since 1990, both the central and the state governments have been interested in attracting the private sector participation in order to increase the capacity of the roads. In the last couple of years various projects have been undertaken involving the private sector participation.
- From experience, it has been seen that small projects such as the bridges and bypasses can attract the private financing.
- Most of the support is still provided by the public sector especially for the major projects. One such project is the expressway from Bangalore to Mysore. The private toll roads being a new concept in India, the first few projects have been on a smaller level.

MOST and NHAI signed concessions with the private sector for approximately \$240 million to construct nearly 20 bridge and bypass projects. Of all the facilities, which have been operational since 1997, Thane-Bhiwandi Bypass in Maharashtra is earning the revenues more than 60% above the projections. Several other projects are in the pipeline. Some of the projects that have been completed are represented in the Table 1.2

**Table 1.2 Toll projects completed with the private sector participation**

Name of Project	Length (kms)	Concession period	Estimated cost (Rs million)
Thane-bhiwandi Bypass: Two lanes	24	7 yrs, 8 months	170
Udaipur bypass	11	10 yrs, 2 months	240
Chalthan ROB	-	2 yrs	100
Pali bypass	7	-	102.5
Delhi-Noida toll bridge	-	30	4000

*(Source: world bank & Public-Private Infrastructure Advisory Facility, 2000)*

Several projects are in the pipeline and have been tabulated in the following table

**Table 1.3 National Highways Authority of India's Project pipeline-Private Financing**

Project name	Length (kms)	Project cost (Rs million)
Jaipur-kisangarh	93	3500
Hosur-Krishnagiri	61	2250
Chinglepet-Tindivanam	55	2100
Ahmedabad-Vadodara	93	3400
Belgaria bypass	-	1000

*(Source: NHAI, 1999)*

#### *1.6.1.1 Road User charges*

The Central Road Fund determines the charges and the fees for the road users. At present, the road user charges are about 2.1 percent of the overall GDP (*World Bank and Public-*

*Private Infrastructure advisory Facility, 2000*). The Ministry of finance is responsible for allocating the funds for the road users.

#### 1.6.1.2 Risk Allocation

Projects that have been completed have involved the construction of a new facility as well as the capacity expansion on a new route. The below table represents the public support provided to the privately financed road projects in India.

**Table 1.4 Public Support Provided to Privately Financed Road Projects in India.**

Project	Public Agency	Nature of support and government participation
Durg Bypass	NHAI	NHAI subordinated the loans and the subordinated package covered senior debts in all events of default.
Pali Bypass	Government of Rajasthan	Traffic guarantee
NH8- Jaipur Kishangarh four lane expansion	NHAI	Subordinated package covered senior debts in all events of default, equity support in the form of the grants, revenue shortfall loan.

*(Source: world bank & Public-Private Infrastructure Advisory Facility, 2000)*

#### 1.6.1.3 Toll Rates and the performance Incentives

Most of the projects awarded to the private sector have been based on the lowest concession period since the public sector already defined the tolls and the traffic level to be used for the bid. The concession period was fixed by the bid and could not be changed according to the demand *(World Bank & Public-Private Infrastructure Advisory Facility, 2000)*

The below points by the World Bank staff provides an analysis of risk allocation for the jaipur-kishangarh section (a 93 Km six lane highway with a project cost of Rs 3,500 million (\$70 million), makes it one of the largest toll highway project in India)

This helps in getting an overview of the contractual framework for sharing of the risks. The key points include the following:

1. The NHAI allowed only 180 days to achieve the financial closure, which is a very tight time period for closure even for the countries with established toll road development programs.
2. The concessionaire is not required to prepare a maintenance fund.
3. In this particular project the support provided by the NHAI is less than that provided for the other projects.
4. Tolls are not indexed to the foreign rate movements. The government does not provide any exchange rate guarantee, which can expose the government to substantial liabilities.
5. The senior lenders faced less risk because of the NHAI commitment to meet debt in the event of the termination of the project.

#### *1.6.1.4 Delays with Permits and Access to the Site*

According to the *World Bank & Public-Private Infrastructure Advisory Facility, 2000*, the main concern for the private sector was the delays in getting the clearances and the right-of way free of encumbrances. There have been recent amendments, which have helped the process. A January 1997 ordinance amended the National highways Act and allowed the central government to acquire the land for the public highways. The April 1997 Environmental Protection Act clarified the procedures for environmental procedures required for the road construction. According to this act, Ministry of Environment and Forests clearance is not required for projects, which are related to the widening of the existing facility with marginal land acquisition along the existing

alignments. World Bank identified that the key is to develop the public sector support mechanisms, which are well targeted and easy to monitor

### **1.6.2 For Airports**

According to the *Airports Authority of India*<sup>6</sup>, the government, in the area of privatization of the airways sector, has taken following initiatives:

1. The Government decided to corporatize Delhi, Mumbai, Chennai and Calcutta Airports in order to gain the finances for the development of the airports to the world-class level.
2. The Government made a decision to set up a parallel Cargo Terminal Indira Gandhi International Airport (Delhi) with the help of the private sector in order to offer better service to the users and also to increase efficiency by starting competition.

The policy on airport Infrastructure in 1997 laid an emphasis on increasing the private sector participation Till date, the partially financed cochin airport has been commissioned in a BOO (build-own-operate) basis. For this particular airport, the government of Kerela has provided guarantees for the entire term loan. Tata Industries Ltd (India), Raytheon Engineering and construction (USA) and Information Technology Park Investments (Singapore) proposed an airport at Bangalore of the BOO nature but the project had to be abandoned because of the future traffic allocations, terms for the transfer of ownership titles to make the land available etc. (*World Bank and Public-Private Infrastructure advisory Facility, 2000*).

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<sup>6</sup> <http://civilaviation.nic.in/aai/airport.htm>

### 1.6.3 The Public-Private Interface

*World Bank and Public-Private Infrastructure advisory Facility, 2000* has identified the various steps in facilitating the implementation of private participation in transport sector in India that are summarized as follows:

- Till date, due to the large number of government agencies involved, there have been significant delays for getting the clearances. More than 270 clearances were required for the approval of the second phase of the Dabhol power project (as reported by the Enron Corporation).
- In 1999, the central government created a Foreign Investment Implementation Authority, which would assist the investors in getting the clearances for the project. Moreover, this is likely to improve the coordination of the state and the central government in handling foreign investments in the infrastructure.
- There is an increasing awareness of the concept of risk analysis, among the various states, for the projects that involve the private sector participation. The Indian Government is seeking ways to reduce its financial exposure.
- In the past there have been growing concerns about the level of contingent liabilities that the state governments incur. The World Bank Group has recommended that the state government can plan to establish a body that provides one to one interaction for the private sector and the investors. Such bodies would be responsible for getting the necessary clearances and would coordinate effectively with the public agencies.



## 1.7 Reforms and the Current Transportation/Infrastructure Projects in India

In the recent years, the central and many state governments have made various reforms, which include the policy, and the institutional reforms. Great amount of emphasis has been made to increase the capacity and the quality of the transport infrastructure. This is evident by the allocation of funds in the Ninth five-year Plan (1997-2002) where more funds have been allocated to the transport sector. The percentage allocated to the transport sector is 20.18% (*Economic survey of Delhi, 2001-2002*). Due to the increase in the funds, various ambitious projects have been conceived and implemented in India. Mega-projects have been planned and implemented in the metro cities in the last decade. Three major projects that would interest the transport professionals are the following. These projects have been developed recently (after 1995) and are very important because of their location and the new technologies being used. Also Bandra-Worli Sea-Link has been used as a case study in the third chapter of the thesis.

1. The Bandra- Worli Sea Link:<sup>7</sup> - Mumbai, the industrial capital of India, is facing several problems regarding the traffic congestion. Various projects have been conceived and implemented for alleviating this problem. Bandra-Worli Sea Link is a very ambitious project and is one of the most highly recommended projects in India in the last thirty years. This is a unique project and hence provides a good case for the study.

Presently, Mahim Causeway is the only link between the western suburbs and the islands of Mumbai. Due to this single link providing all the access, the North-south corridor is heavily congested and leads to the formation of bottleneck at the Mahim Causeway. In order to control this situation, an additional link is being developed across the bay, which is known as the “Bandra-Worli Sea Link”.

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<sup>7</sup> Maharashtra State Road Development Corporation; [http:// www.msrdc.com](http://www.msrdc.com)

2. Navi-Mumbai International Airport:<sup>8</sup> - Navi Mumbai, a city adjacent to Mumbai, is being planned as a special economic zone (SEZ). This is the largest Special Economic Zone in India, which is being planned by the City and Industrial Development Corporation, Maharashtra (CIDCO).

A large numbers of developments are underway to make Navi Mumbai- the city of the 21<sup>st</sup> Century. A huge amount of capital is being invested to develop and create the infrastructure in the area. Existing infrastructure facilities including feeder roads and railway lines are being improved to match the international quality levels.

As part of the infrastructure development, an international airport is being planned at Navi Mumbai. CIDCO proposes that the airport would lead to the development of the area and would also help to direct some of the traffic of Mumbai Airport, which is predicted to be saturated by the year 2015-2016 according to the Airport Authority of India.

3. The Nagpur-Hub Airport:<sup>9</sup> - Nagpur, the second capital of Maharashtra, is one of the fastest growing cities in India. Due to its central position in the Indian sub-continent, it can serve as an international hub for the air traffic between South-East Asia and Middle East Asia. Its not only located in the central part of India but also has a central location between south East Asia as well as Europe, Russia, China and Australia. This strategic location is very good for Nagpur to serve as an International Hub.

Nagpur has excellent transport connections with other parts of the country and major industrial centers. Moreover, the development of an interface between air cargo, rail cargo and road cargo provides an advantage to the Nagpur airport to serve as a Multi-Modal International Hub Airport. The infrastructure of and the transport facilities of the city are well in place to help the hub system.

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<sup>8</sup> City and Industrial Development Corporation; <http://www.cidcoindia.com>

<sup>9</sup> Maharashtra State Road Development Corporation; [http:// www.msrdc.com](http://www.msrdc.com)

Other than the above important projects various reforms have taken place in the transport sector in the last couple of years. In 1996, the Government of India published a report by the name of *Rakesh Mohan Report on Infrastructure*. This was an important landmark report, which examined various issues such as the institutional arrangements, laws and regulations and various other issues that constrained the resources towards the infrastructure and recommended various policies to overcome these problems. The important reform suggested was to allow more participation of the private sector to improve the efficiency and to more funds for investment in transportation.

*World Bank (1995)* suggested some policy reforms, which are as follows:

1. The Easier reforms: These included
  - a). Seaport and airports being privatized
  - b). Bus operations being shifted towards private participation, public safety and low fares.
  - c). Intercity Trucking: Increase the efficiency; find alternative revenue sources that allow the decrease in the road taxes collected at the municipal borders.
  
2. The Harder reforms: These included
  - a). Highway construction: The road industry should be capital-intensive, private sector participation in engineering services.
  - b). Rail: The manufacturing operations of the Indian Railways should be corporatized, the passenger services should be seen as a business instead of social service.
  - c). Urban road and rail services: Improve the traffic management techniques at the institutional level, control parking services, improve the junctions and increase the local participation for running the sub-urban rail services.

Other reforms included the National Highway Authority of India (NHAI) being functional in 1995. It undertook various institutional changes, which has enabled it to look at the roads as a service instead of merely physical infrastructure. Also the National Highway Act (1956) was amended in 1995, in order to allow greater participation of the private sector in highway development.

## **1.8 Summary**

The transport system of India is one of the largest in the world serving a land Area of 3.3 million square km and a population of about 1 billion. The demand for the transport has been growing in the past several years. Road sector passenger and freight demand has increased at a very fast pace. The demand for the passenger traffic increased from 23 billion passenger Km in 1951 to 1500 billion passenger Km in 1995. The freight traffic increased from 6 billion ton to 400 billion ton Km in the same period.

The key issues facing the road sector are unmet demand, low average speed, low maintenance, inadequate capacity and high accident rate. These problems are due to the institutional constraints underlying the transport sector. These constraints as identified by the World Bank are:

- Unclear and Fragmented Responsibilities
- Inadequate Resource Mobilization
- Poor Asset/System Management
- Inadequate Imposition of Accountability

These institutional problems are due to the transport sector being viewed as a social service rather than a business. In an effort to solve these problems, India has implemented private sector participation in the road and the airways sector. In the road sector, small project such as the bridges and the bypasses have been able to attract private sector participation. Recently, few big projects have been able to attract private sector such as the Bandra Worli Sea Link and the Airoli Bridge.

Various steps have been taken by the Government in order to facilitate private sector participation such as the formation of Foreign Investment Implementation Authority in 1999. The National Highway Act amended in 1995 also allowed the greater participation of the private sector. The World Bank views private participation as one of the solution to the existing institutional problems.

## *Chapter 2*

### *Literature Review*

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The present chapter covers the literature relevant to the project work, besides touching upon the fundamentals of the privatization in the infrastructure projects. Various sources have been used for conducting the literature review, which have been included in the bibliography. This chapter would reveal relevant past trends in the private sector participation. The chapter draws conclusion from the literature review about the major factors and the issues to be kept in mind for the thesis.

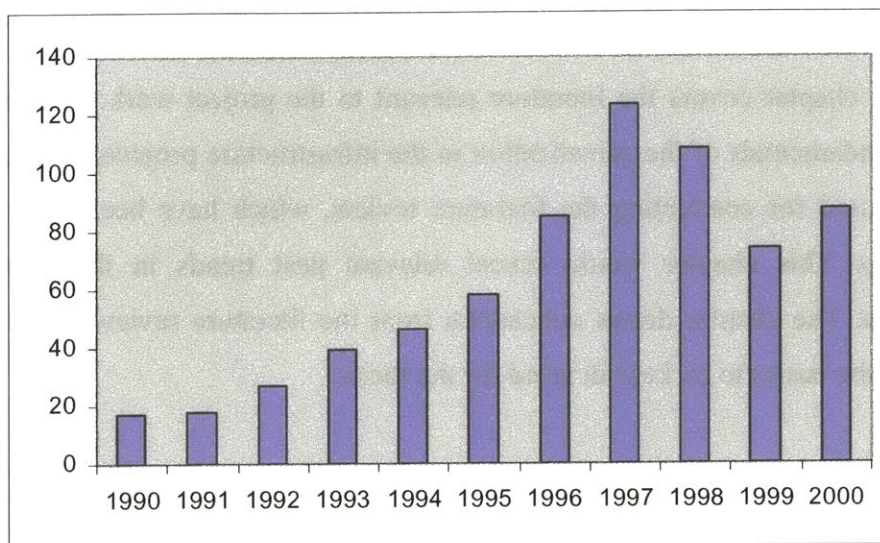
#### **2.1 General**

The important aspects to be reviewed are:

1. The involvement of the private sector in infrastructure projects with special reference to the transport infrastructure.
2. The present status of the private sector participation, the forces driving the need for the privatization, the challenges in its implementation and the experiences from the various cases and studies.
3. The review will also help in identifying the economic, financial and legal issues involved in the implementation of the private sector participation, which would be used in the chapter 4 of the thesis.

Private participation in infrastructure has increased in the recent years, it started slowly in the early 1990's and grew continually up to 1997 and fell down in 1998 and 1999 and again has a positive slope in 2000. Figure 2.1 indicates the trend in the investment in infrastructure projects by the private companies in the developing countries.

**Figure 2.1 Private Participation Investment in Infrastructure in developing countries, 1990-2000 in 2000 US\$ billion**

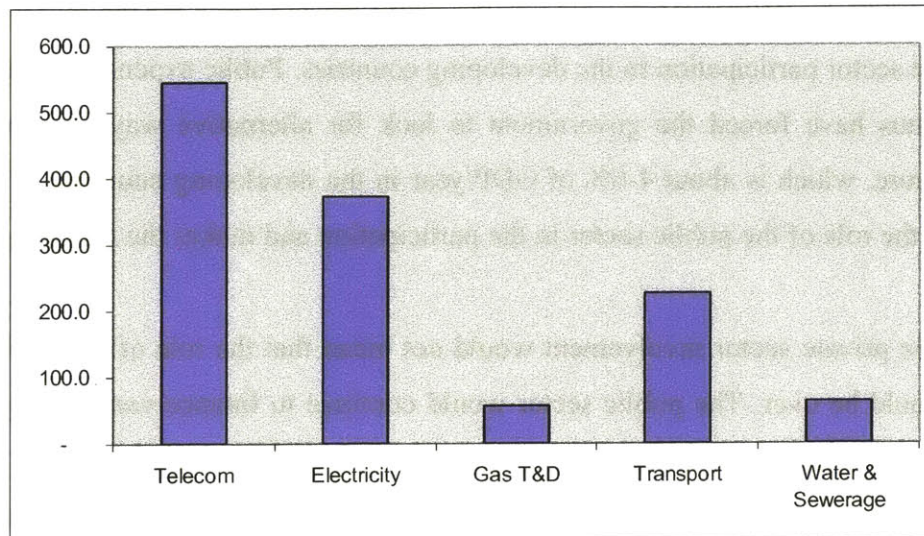


*(Source: World Bank: PPI database, 2000)*

By sector, telecommunications dominated the investment (\$292 billion during 1990-2000), followed by Electricity (\$196.9 billion), then by transport (\$124.9 billion), water and sewerage (\$36.7 billion,) and natural gas transmission and distribution (\$32.7 billion) In the transport sector, roads dominated with \$71.4 billion, followed by railways (\$25.6 billion), ports (\$16.6 billion) and airports (\$11.3 billion).

The following figure gives the sector wise investments in PPI projects in the developing countries.

**Figure 2.2 Sector wise Investment in PPI projects in developing countries, 1990-2000 (in 2000 US\$ billion)**



(Source: World Bank: PPI database, 2000)

Lakshmanan (1997), in his paper “Privatization in Transport” defines privatization as:

- *“Relying more on the private institution of society and less on government to satisfy people’s needs”*
- *“The act of reducing the role of government or increasing the role of private sector in the activity or ownership of assets”*
- *“The act of transferring government enterprises or assets to the private sector”.*

He has also summarized the lessons learnt from the privatization efforts:

- The competitions prevent the restricted supply and also render the government regulation (about the prices) obsolete. The greater the competition, the more the prices approach toward the long run marginal cost.
- If the efficiency gains obtained from the private sector participation are greater then there is a tendency of weakening of the public concerns about the environmental and the equity effects.



- He also concludes that the subsidies for the essential services are reduced and focused.

*Antonio (1995)* determines fiscal crises as the major driving force for the involvement of the private sector participation in the developing countries. Public expenditures have been cut and thus have forced the government to look for alternative ways for funding in infrastructure, which is about 4-6% of GDP/year in the developing countries. Further he identifies the role of the public sector in the participation and makes the following points:

- The private sector involvement would not mean that the role of the public sector would be over. The public sector would continue to finance various projects and would help the private sector in making the projects financially viable.
- The public sector would be defining the policies and the strategies for the transport sector.
- The major change would be that the instead of being the self regulated entity for providing the services, the public sector would become an independent entity and would then compete with the private sector. Thus the monopoly would be decreased in the transport infrastructures.

In his paper, he also identifies the different types of the private participation, which is used in the transport sector. They are:

- **Divestiture:** This is the sale of the public assets to the private sector and may take the form of shares or the trade sales of the assets themselves.
- **Greenfield Projects:** This consists of the new projects that are commissioned to the private sector e.g. included the Build-Operate and Transfer. This method of the participation helps in better allocation of the risks involved in the financing the infrastructure projects.

- **Operations and Maintenance:** In this form of participation the private sector is allowed to operate and maintain the service and is required to invest in the project. These are relatively short lived for 2-5 years and government is responsible for all the risks in the project.
- **Concession contracts (or franchises):** In this type of the partnership, the assets are rented out to the private sector and are not transferred to the private sector. These are long term for about 10-30 years and the private sector bears all the risks for the project.

*Philip (2001)* discusses the recent trends in the private sector participation in infrastructure projects.

He comments on the effect of the private participation on the fiscal/financing sector. According to him, the private participation allows the financial burden to be transferred from the taxpayers to the private investors and the consumers. He also comments that the private participation give the government the provision of the sale of the shares and the right to operate. The participation may also effect the government in the long run by not having to incur the regular subsidy payments and also have a gain the corporate taxes. Further he also discusses the impact of the private sector on the following areas.

*Labor:* According to him privatization leads to an increase in the labor productivity and creates greater incentives for the operating efficiency. The increase in the privatization leads to the decrease in the employment level.

*Risk Transfer:* public financing leaves the risk to the taxpayers but in private financing the risks are borne by the private sector and the investors. This leads to an increase in the incentives for prudent risk management and efficiency and also to the strengthening of the government's financial position.

*Regulatory framework:* Private participation helps in establishing in conditions for clarifying and improving the regulatory framework. A close relationship between the operators and the policymakers helps in avoiding the conflicts and helps the government in establishing quality sound regulations.

He also presents the estimated gains from the deregulation of several US industries, which is presented in the following table.

**Table 2.1 Estimated Gains form Deregulation of Selected US Industries**

<b>Sector</b>	<b>Extent of Deregulation</b>	<b>Estimated annual Gains (billions of 1990 US\$)</b>
Airlines	Complete	13.7–19.7
Trucking	Substantial	10.6
Railroads	Partial	10.4–12.9
Telecommunications	Substantial	0.7–1.6
<b>TOTAL</b>		<b>35.4–44.8</b>

Source: Philip (2001)

*Abdulaziz (2001)* talks about the driving forces for the participation of the privatization in infrastructure.

1. *The shortage of public funding.*
2. *The notion of efficiency in private enterprises.*
3. *The expansion of capital markets and innovative infrastructure finance mechanisms*
4. *A political trend towards the deregulation of infrastructure.*

According to him, in the developing countries, the private foreign financing for infrastructure projects increased from .1 billion dollars in 1988 to about 20.3 billion dollars in the year 1996.

He also identifies that according to the World Bank Group; various low income developing countries have made a transition to the private sector participation since 1990. Between 1990 and 1999, the proportion grew from 20% to 80%. Private investments in infrastructure rose to a level of \$35.1 billion in 1997 and in the transport sector; over 190 projects were implemented in 20 developing countries, with a total investment of \$23 billion.

He also identifies the structure of public/private partnerships, which varies from project to project and depends on the following factors: a). Initiation and planning b). Design and engineering c). Financing d). Construction e). Ownership f). Operation g). Revenue collection.

The amount of public and the private participation varies at different degrees from fully public to fully private and gives rise to various options which include the following:

1. Operation and maintenance (O&M)
2. Super turnkey development<sup>1</sup>
3. Wraparound addition<sup>22</sup>
4. Lease-Develop-Operate
5. Temporary Privatization
6. Buy-Build-operate
7. Build-Transfer-operate
8. Build-operate-Transfer
9. Build-Own-operate

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<sup>1</sup> "Under a typical turnkey procurement, a transit agency contracts with a single private entity for design, construction and delivery of a complete and operational project"

- <http://www.fta.dot.gov/library/technology/houstrnk/appenda.htm>

<sup>2</sup> "A private organization develops an addition to an existing facility and operates the combined facility for a given period" - <http://eisenhowerfellowships.org/pages/download/02multi/Osunsanya.doc>

He also identifies various problems with the current decision making processes for the selection of the BOT toll road projects. The most common problems found are stated as follows:

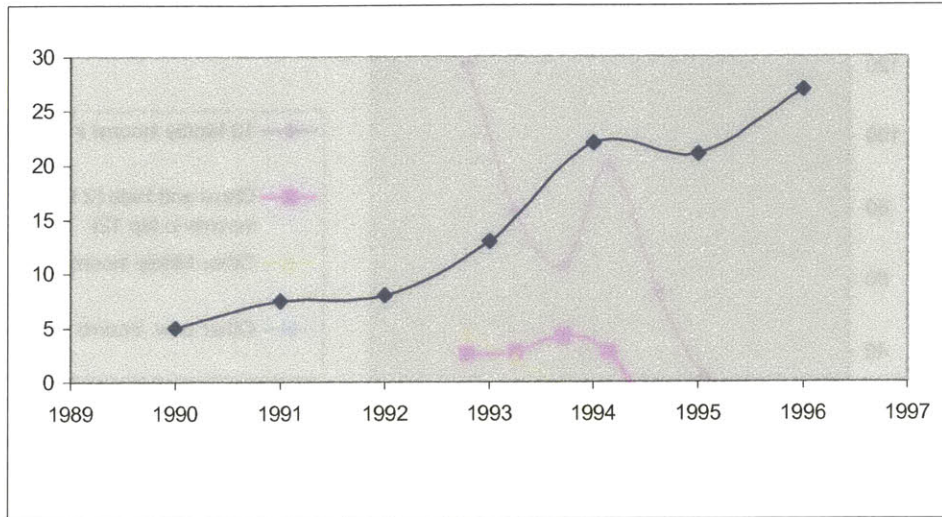
- The current procedures do not consider all the relevant criteria and the variables that effect the BOT projects
- The current procedures are very time consuming and needs great amount of effort.
- There is no transparency in the evaluation procedure because of the lack of the clear procedure.
- Because of the problems with the evaluation process, the cost of the project is increased by the private investors and hence increasing the cost for the public sector.
- In developing countries, there is no expertise in the area of developing good evaluating procedures.

*World Bank (2000)* finds the main reasons, which constrain the private sector involvement in Infrastructure Projects. They are:

- Poor policies and inadequate regulations
- High contracting and Bidding Costs
- Expensive Financing Terms
- Weak domestic capital Markets
- Few sub sovereign governments are creditworthy.

The group also suggests the action program to reduce these barriers by drawing on its sectoral and global experience. The report also discusses the gains from private participation in infrastructure. Following are the findings of the World Bank with respect to privatization in and are indicated by the following figures.

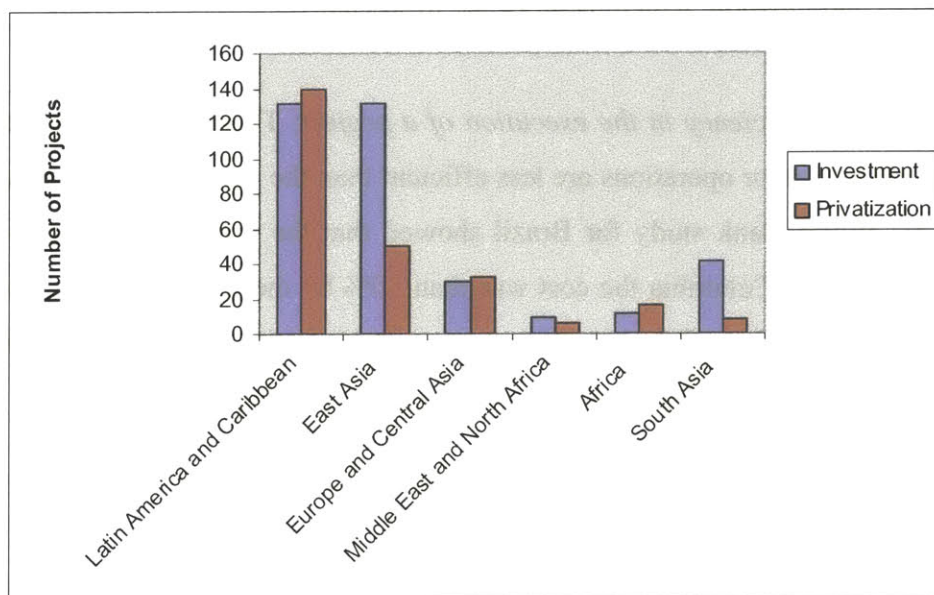
**Figure 2.3 Private International financial flows to infrastructure grew rapidly to 1994 (In US\$ billion)**



(Source: Global Development Finance 1997)

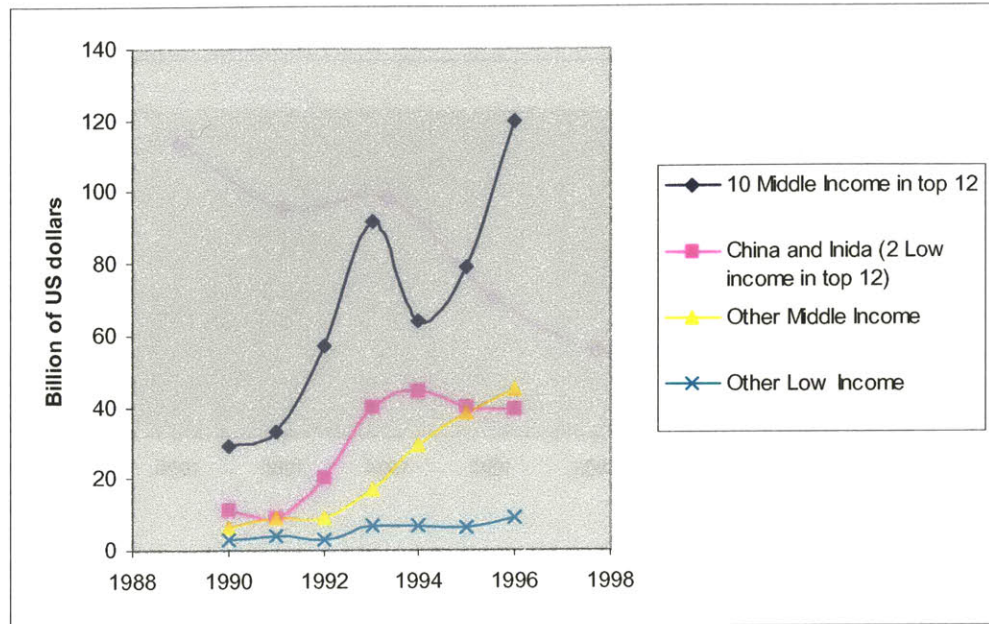
**Figure 2.4 Number of private investment projects and privatizations varies widely by region-**

**Note: Number of actual projects or transactions, 1984-1996**



(Source: PPI database, World Bank 1997)

**Figure 2.5 Private Capital Flows are concentrated in a few low and middle-income countries**

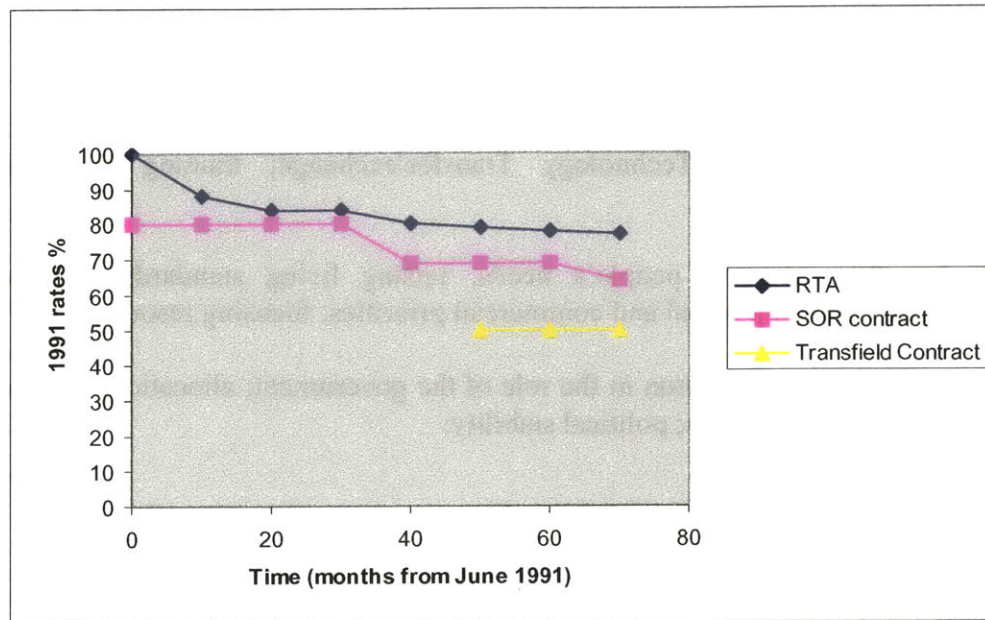


(Source: Global Development Finance, 1997)

The World Bank Group (PPI Toolkit) also summarizes the expected benefits from the private sector participation, which includes the following:

- Increasing efficiency in the execution of a project:* There has been evidence that the public sector operations are less efficient than the private sector contractors. A 1992 World Bank study for Brazil showed that the maintenance cost were less than 25%. In Columbia the cost was than 50% by the involvement of the private sector. The below chart has been presented by the World Bank and shows the efficiency gains in Australia through the contracting process.

**Figure 2.6 Saving of the maintenance cost in Australia through contracting**



(Source: Roads and Traffic Authority, NSW)

- *Enhancing implementation capacity:* The private participation would lead to the enhancement in the implementation capacity because of the flexibility in the mobilization of the resources.
- *Reducing the risk for the private sector:* Private participation leads to the transfer of the risks from the public sector to the private sector and independent investors.
- *Mobilizing financial resources:* Since the private sector has to maximize the return on the investment, it generates the better mobilization of the financial resources.

The economic commission for Europe (1998) has identified the exact benefits of the public private partnerships in infrastructure, which includes the following:

**Fiscal benefits:** easing budgetary constraints; optimal risk allocation; accurate costing.



**Economic benefits:** speed of delivery; modernization; reliability; efficiency; access to international finance; fostering local capital markets.

***Indirect benefits***

**Technological benefits:** Technology Transfer/exchange; training for local staff; innovation.

**Social benefits:** Meeting people's needs, raising living standards, improving the environment; balancing social and commercial priorities; focusing resources.

**Political benefits:** re-definition in the role of the government; allocation, not abdication; curb on distorting influences; political stability;

*Menendez (1998) identified the following issues:*

***Institutional Issues***

1. A clear and mature regulatory framework- This is very necessary in order to prevent the monopolistic situations and also to control the sharp increase or decrease in the levels of tolls and the level of service.
2. There should be a very clear sector policy environment.

***Political and Bureaucratic constraints***

These include:

- The participation of various public agencies leading to fragmented decision making.
- Great amount of emphasis on the administrative process and little emphasis on the strategies and the results. The whole process is a lengthy one split in three to four phases from planning to the final operation.

These issues have to be properly dealt with in order to decrease the length of the tedious process of infrastructure development. Also clear and sustainable rules and regulations must be established between the public sector, the users and the private sector.

### ***Financial constraints***

These arise because of the limited public resources and hesitant user's charges policies. The transport investments are often huge and are recovered over a long period of time. Secondly the investments are largely sunk and the assets are not used elsewhere except sometimes at a huge capital cost.

### ***Methodological constraints***

These arise because of the lack of the knowledge of inter-relationship between the various variables involved in the process. This prevents the clear definition of the performance indicators that are important to defining the economic and risk evaluation of the transport projects. Overcoming these constraints would allow:

- Estimation of the conditions under which the project may be feasible or non-feasible.
- The performance of proper risk-analysis.
- Defining proper quality and the level of service.

### ***Regulatory constraints***

These arise due to the lack of the proper defining of the responsibilities among the regulatory agencies and public units (ministerial units). Also there is lack of the proper framework for the resolution of the disputes. These constraints need to be overcome in order to delineate the market competition and prevent the legal issues involved for project construction and operation.

In a public private partnership there is a collaborative effort between the public and the private sector. In these types of partnerships the each partner shares in the design of the project and also shares various responsibilities in terms of the financial, managerial and the technical resources. According to Menendez (1998), public-private partnerships are viable when:

- The public wants to maintain the responsibility for some of the assets.
- The public sector makes the project 'bankable'
- The implementations of the future projects investments are uncertain

Due to the public nature of the transport projects, these have to comply with the regulations established by the government for addressing the environmental, safety and the social considerations.

Menendez identified that the involvement of the public sector becomes important because:

A completely private owned project would have an aim of increasing the revenues rather than the total economic value of the project. It is therefore necessary to have a tradeoff between the financial rate of return and the economic rate of return. The financial rate of return can be improved by increasing the user charges but then the economic rate of return may fall down and hence a compromise between the two has to be found out.

A case is presented of the Colombia Road tolls in order to illustrate the above point:

***Columbia Road Tolls- balancing political acceptability, economic benefits and financial returns***

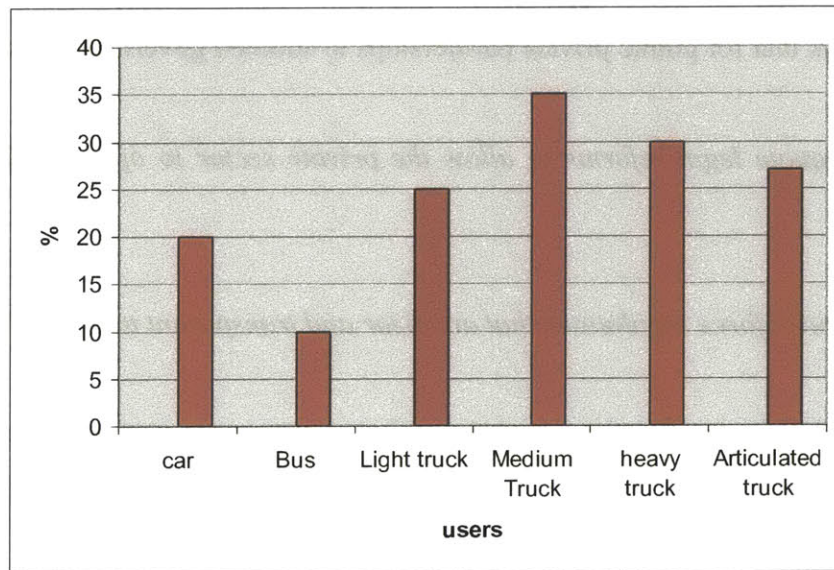
*Menendez (1998)* identified the following project to show the tradeoff between the economic benefits and financial benefits.

The Tobiagrande-Puerto Salgar project, which is a major toll road project in Columbia, was put in conjunction with the already existing tolls roads. The toll rate on this road was already defined in the concession contract in order to eliminate the political pressures. The toll rate was defined based on the following two factors;

1. The expected benefits to different users because of the shorter travel times and distances and better level of service.
2. The tradeoff between the financial rate of return and the economic rate of return.

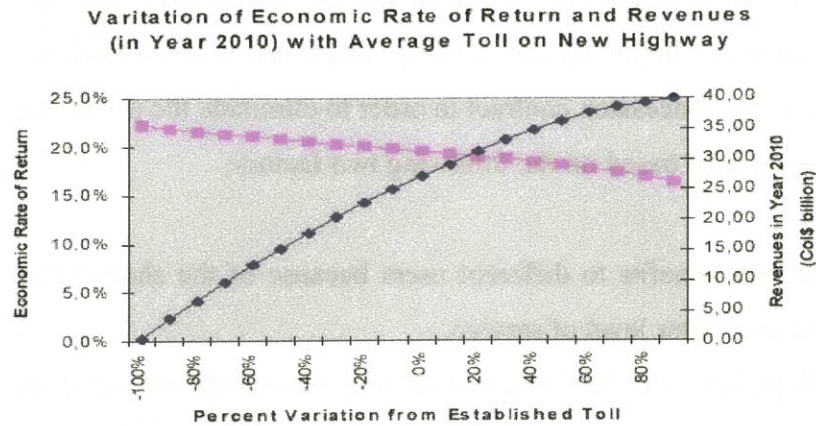
For the first factor figure 2.7 gives the value of the tolls as percentage of User' benefits and for the second factor figure 2.8 gives the variation of economic rate of return and revenues with average toll on the new highway.

**Figure 2.7 Tolls as percentage of user benefits**



*(Source: Menendez, 1998)*

Figure 2.8



(Source: Menendez, 1998)

Dennis (2001), in his paper “Partnership for Development: Government-Private Sector Cooperation in service Provision”, discusses about the need of government and Private Sector Cooperation. He identifies the potential advantages of the Public Private Cooperation and the different type of Co-operations between the public and the private sector. He says that for public private partnerships to succeed government should:

- 1) *Enact adequate legal reforms to allow the private sector to operate efficiently and effectively;*
- 2) *Develop and enforce regulations that are clear and transparent to private investors;*
- 3) *Remove unnecessary restrictions on the ability of private enterprises to compete in the market;*
- 4) *Allow for liquidation or bankruptcy of existing state enterprises that cannot be commercialized or privatized;*
- 5) *Expand opportunities for local private enterprises to develop management capabilities;*

6) *Create incentives and assurances to protect current state employees after PPPs take over service provision; and*

7) *Redefine the role of government from producing and delivering services directly to facilitating and regulating private sector service provision.*<sup>42</sup>

*Allen et al (1989)* has made a discussion on the public-private initiative in the US for the Dulles Toll Road Extension and has drawn the following conclusions:

- Ownership structure of a project is extremely important
- The shortfalls during the early years of operation can be alleviated by the needed infrastructure advancement.
- The private owned projects should be evaluated on the rate of return basis rather than the rate regulation issue.
- Public need is the most important aspect for the privately owned project. Any legal or institutional challenge can be handled if the need is strong enough.
- The increased Globalization and the institutionalism of the world economy are providing the ground for the privatization.

*Tiong (1990)*, in his paper, has performed the comparison of six BOT cases, three of the cases being from the developed countries and the rest from the developed countries. Various factors have been compared in terms of the financial, technical and the economical aspects. The paper provides some vital suggestions for the successful operation and completion of a BOT project. They are:

- Government support is critical for the success of a BOT projects.
- The risks should be properly allocated and

- All the parties involved should be given meaningful incentives and guarantees.

*Button (1987)* finds out some of the primary issues of interest with regard to privatization in transport sector, he describes how tolls played an important part in the early growth of the road system in the United Kingdom. The lesson learnt from this experience has been considered. The official policy with respect to the toll facilities has also been examined. The paper mainly focuses on the financial problems that arose due to the favored “accountancy” approach to tolling and cost recovery. The paper concludes that there are serious problems in initiating ill-thought-out toll policies.

*Vajpayee et al (1999)* talks about how the new approach to infrastructure development gave support to the wave of “Privatization” and deregulation around the world. The report talks about five reasons to having the change on infrastructure. They are: 1. resources required for infrastructure 2. Efficiency of investment and delivery 3. Changes in technology 4. helping competitiveness of businesses 5. Possibility of raising large funds because of the integration of world capital markets.

*Ruster (1997)* provides a retrospective on the Mexican Toll Road Program, which almost doubled the national toll road network –from 4500 kms to 9900 kms. He finds the major issues and the sector performance for this program and also puts a light on the regulatory and the institutional framework. The main lesson learnt is that “...for governments developing a sector program based on private investment is the necessity of devising systems of regulation and support that provide the encouragement and maneuver that the private sector needs, while minimizing the government’s exposure to the host of commercial and financial risks surround projects”-Ruster . The policy recommendations in the paper include:

- Sector strategy should have sound and explicit initiatives for selecting the projects.
- Prices should be viable for privatized enterprises
- The regulatory framework should ensure adequate services

## **2.2 Summary of the Chapter**

From the present chapter following framework can be defined for the private sector participation.

- What is private sector participation?
- What are the benefits due to the implementation of the private sector participation?
- What is the driving forces/need for the private sector participation?
- What are the constraints in the implementation of the private sector participation?
- What are the important conditions/issues to be kept in mind in the implementation of the private sector participation?

Also it is important to recognize how the driving forces and the constraints interact. The following section answers the above questions.

### ***Definition of private sector participation***

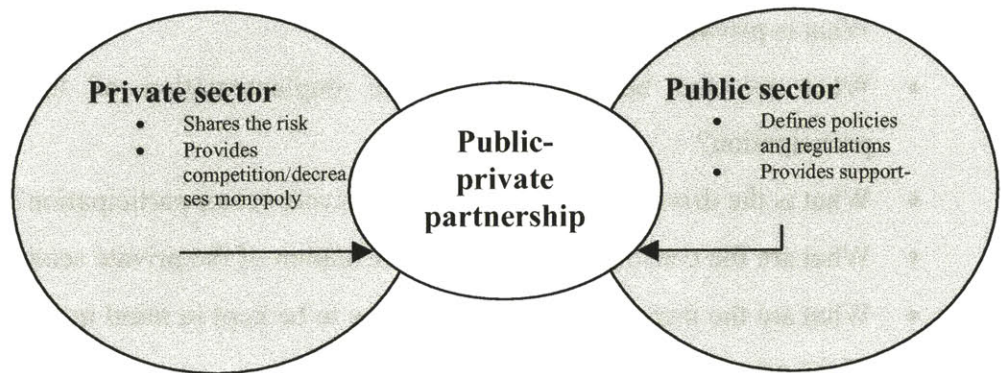
From the literature following are the characteristics of the private sector participation in infrastructure

1. The process of transferring assets to the private sector in order to increase the role of the private sector and relying on the private sector to fulfill the needs of the society.
2. The role of the government is not reduced fully but the public and the private sector compete in the market. The public sector still defines the policies and the regulations for the transport sector. The public sector also helps the private in financing the project and making it financially viable.



The interaction between the public and the private sector is explained in figure 2.9

**Figure 2.9 Interaction between the public and the private sector.**



From the above figure it is clear that the public and the private sector share the responsibilities. Depending on the different types of partnerships the role of the different sectors decreases or increases.

The different types of the partnerships as identified in the chapter are: Divestiture; Greenfield Projects; Operations and Maintenance; Concession contracts.

Depending on the degree of the public and the private participation, various options arise which have been described in the following table.

**Table 2.2 Different options for public and private partnerships**

<b>Fully Public Sector</b>
Operation and Maintenance
Super Turnkey Operation
Wraparound Operation
Lease-Develop-Operate
Temporary Privatization
Buy-Build-operate
Build-Transfer-operate
Build-operate-Transfer
Build-own-operate
<b>Fully private sector</b>

***Benefits of private sector participation***

Following table presents the benefits of the participation of the private sector participation in Infrastructure.

**Table 2.3 Benefits in the participation of the private sector**

<b>Area</b>	<b>Benefits</b>
<b>General</b>	<ul style="list-style-type: none"> <li>• Increasing efficiency in the execution of the project</li> <li>• Enhancing implementation capacity</li> <li>• Reducing the risk for the private sector</li> <li>• Mobilizing financial resources</li> <li>• Providing better regulatory framework</li> </ul>

<b>Fiscal benefits</b>	<ul style="list-style-type: none"> <li>• Easing budgetary constraints</li> <li>• Optimal risk allocation</li> <li>• Accurate costing</li> </ul>
<b>Economic benefits</b>	<ul style="list-style-type: none"> <li>• Speed of delivery</li> <li>• Modernization</li> <li>• Reliability</li> <li>• Fostering local capital markets</li> </ul>
<b>Technological benefits</b>	<ul style="list-style-type: none"> <li>• Technology Transfer</li> <li>• Innovation</li> </ul>
<b>Social Benefits</b>	<ul style="list-style-type: none"> <li>• Meeting people's needs</li> <li>• Balancing social and commercial priorities</li> </ul>

***Driving forces for the private sector participation***

- The shortage of public funding or the lack of resources required for infrastructure
- Possibility of raising large funds because of the integration of world capital markets
- Political trend towards the deregulation of infrastructure
- The notion of efficiency in private enterprises
- Changes in the technology
- Helping competitiveness of businesses

***Constraints in the participation of the private participation***

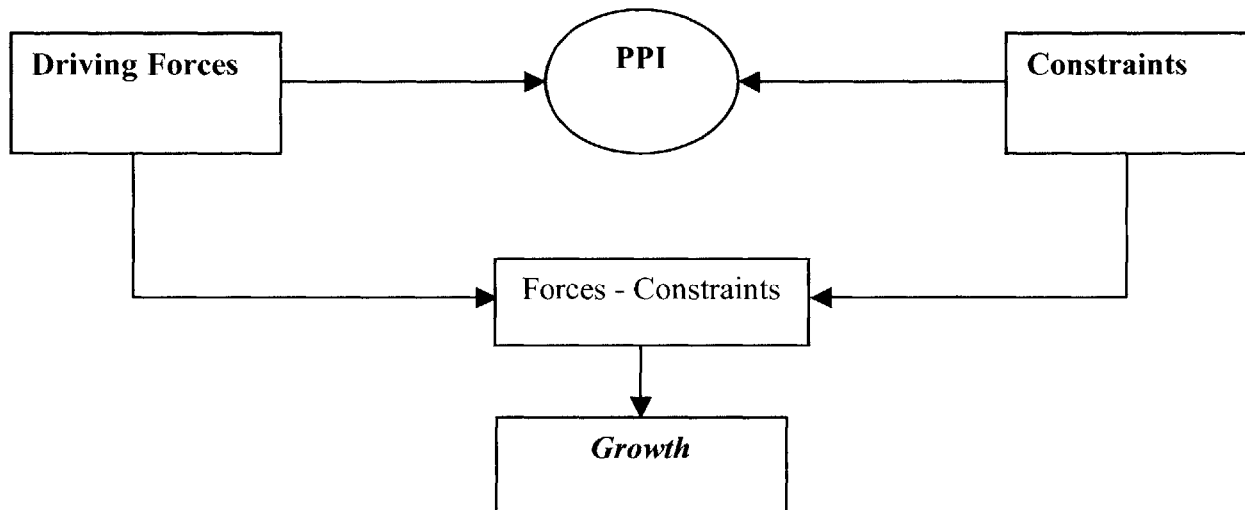
- Lack of proper legal framework for allowing the private sector to operate efficiently and effectively.
- Unclear regulations for the private investors.  
Poor policies and inadequate regulations.
- High Contracting and Bidding costs

- Weak domestic capital markets
- Few sub sovereign governments being creditworthy.
- Lack of expertise in the area of developing good evaluating procedures.

It is important that steps should be taken in order to decrease the constraints in the implementation of the private sector participation. Various suggestions have been provided by *Dennis (2001)*.

The below figure shows the interaction between the driving forces and the constraints in the implementation of the private sector participation.

**Figure 2.10 Interaction between the driving forces and the constraints**



The purpose of the reforms should be to decrease the constraints and increase the growth of the private sector.

*The Need for Reforms in the Indian Transport Sector*

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The first chapter provided an overview of the transport sector of India identifying the major issues faced by the sector. Due to these issues involved with the transport sector, the Indian economy and the country suffer a large number of direct as well as indirect impacts. The chapter brings forward these impacts and outcomes, making clear the importance of the changes to be made in order to improve the sector. The Indian Government has made various reforms in the past. Although notable progress has been made, the overall performance is still far from serving the current and the anticipated future demand. The chapter presents the important reforms taken in the past and also brings forward the lessons learned from these reforms. Based on the lessons learnt from these reforms, various reforms have been suggested for the future by different institutions and have been discussed in the present chapter.

**3.1 The outcomes of the poor transport sector**

In spite of India being one of the largest transport sectors in the World, there have been several deficiencies in the sector as discussed in the first chapter. Due to these deficiencies the country faces various negative impacts. These impacts are divided in to the direct impacts and indirect impacts.

**Direct Impacts-** These are direct outcomes of the deficiencies in the transport sector. These include:

1. Loss of time and money in moving the goods and services: there is a huge loss of time and money because of the deficiencies in the transport sector. The low average speed coupled with congestion causes delays in the transportation of goods and services. New business practices such as the JIT (just in time)

inventory are based on speedy and reliable transport sector. Such capabilities would improve the value of the transport sector to the economy.

2. Pollution – transport demand continues to increase because of the high rate of population growth in India, along with changes in travel patterns. The pollution problem is very serious in India because of the poor condition of the vehicles, which have a very low fuel burning efficiency. The quality of the fuels used are also not very good, leading to greater amount of emissions and pollutants.
3. Congestion: due to the high road transport demand and large number of vehicles, congestion becomes a serious issue for the metropolitan cities in India. The loss from the congestion and poor roads was estimated to be about \$2.6-6.5 billion a year (*Rakesh Mohan Report on Infrastructure-1996*)
4. Safety Issues- the accident rate for the roads has been high in India as compared to other developed nations, as discussed in the first chapter.

**Indirect Impacts-** These are caused by the transport sector in an indirect manner. The affects of these impacts are seen in the longer run than the direct impacts. These include:

1. Low economic growth: the transport sector is very central to the effective operation of the economy. The efficiency of the other sectors is dependent on the transport sector and a poor transport sector can become a drag to the economy of the country. In order to increase the economic growth, it is very important that India make serious efforts to improve the transport sector.
2. Poverty: India faces an enormous poverty problem with many people living below less than a dollar a day. According to the World Bank (*Bansal et al, 2002*), there is a very close relation between transport and poverty reduction. Faster economic growth is required to decrease the poverty level, and the transport sector provides major contribution for the economic growth. From 1991 to 2002, the economic

growth was 6.0-6.5 percent a year. The Ninth year plan (1997-2002) set the target for an annual rate of 7.4 percent per year for the next ten years, and an improved transport sector would help in achieving the same.

3. Social inequity: in India, poor groups are more exposed to the accidents because of the type of the modes they use. The only options available to the lowest income group are to walk or to use non-motorized transport. The poor income groups suffer more from accidents, as they lack access to good health care. These increase the bridge between the rich and the poor creating social inequity.
4. Negative social impacts: According to *Bansal et al (2002)*, the transport sector causes various negative social impacts, including displacement of non-motorized transport, damage to cultural properties, and spread of diseases such as HIV/AIDS.

The following table summarizes the direct and indirect impacts of deficiencies in the transport sector.

**Table 3.1 Direct and Indirect Impacts of deficiencies in the Indian Transport Sector**

<b>Direct Impacts</b>	<b>Indirect Impacts</b>
Loss of time and money	Low economic Growth
Pollution	Poverty
Congestion	Social inequity
Safety	Negative social impacts

The problems of the transport sector are well known. In attempting to improve this transport sector, India has undertaken several important reforms, as discussed in the next section.



### 3.2 Reforms in the Transport Sector

This section presents the important reforms taken by the Government in the last decade. The information about the reforms has been obtained from *Bansal et al, 2002*.

1. In 1989, an “open skies” policy was adopted which allowed the foreign cargo airlines to enter and thus opened the doors for high-value exports.
2. Market liberalization started to take place in 1991.
3. The reform actions taken place in the early 1990’s helped to set up a legal and administrative environment for private sector participation for the transport sector in India especially in ports and ocean shipping. Newer ways were invented to provide the needed service. In 1991, Indian Railways created a multi modal service known as the CONCOR which provided import and export multi-modal container transport services to and from ports.
4. In 1992, Delhi (capital of India) liberalized its bus transport allowing the entry of the private sector.
5. In 1993, a Multi-Modal Transport Act was passed by the Government of India, which helped facilitating the international door-to-door shipments.
6. All these developments helped to establish an environment for the private participation by the mid 1990’s.
7. In 1996, Rakesh Mohan Report on Infrastructure was published which examined the institutional arrangements, laws and regulations, and sector specific constraints and provided various recommendations to improve the transport sector (*Rakesh Mohan Committee, 1996*). The reforms suggested in the report are presented in Box 3.1

**Box 3.1 Reforms suggested by the Rakesh Mohan Committee Report, 1996**

*For Urban Transport*

- The local bodies should be responsible for providing the entire infrastructure for transport in cities.
- Urban roads be contracted to the private sector with appropriate quality control.

*For Roads*

- Participate with the private sector to develop the highways.
- Develop proper guidelines and procedures for approving the private sector projects.
- Use of toll roads
- Get the revenue from motor vehicle and transport fuel taxes.

*(Source: The Rakesh Mohan Committee, 1996)*

8. The National Highway Authority of India (NHAI) came into existence in 1995 and took various important steps to enhance the maintenance and operation of the national highway system. The National Highway Act was amended in 1995 to help participation of the private sector. A rural road policy framework was adopted by the Government of Andhra Pradesh (a state in southern India) that emphasized the use of the economic criteria in the decision making for rural road investment.
9. In 1999, the Government of India levied taxes on diesel and the gasoline. The revenue collected went to the development of the national, state and the rural roads.
10. Very little reforms have been taken in the Railway sector. In 1995, the Government of India made a notable step by forming an organization known as the Mumbai Rail Vikas Corporation (MRVC). The corporation is owned jointly by the Indian Railways and state government of Maharashtra and is responsible for developing the rail sector in Mumbai.

These reforms have helped India achieve a notable improvement in the transport sector since 1995, but they have been unable to provide the performance sufficient to meet the current and predicted future demand. These reforms have helped in learning various lessons, which can be utilized in the future to prevent mistakes. The next section presents the various lessons learnt from these reforms.

### **3.3 Lessons learnt from various Reforms**

World Bank (*Bansal et al, 2002*) has conducted a study on the lessons learnt from the various reforms. Some of these lessons are very relevant to the present study and are presented as follows:

1. The reforms taken have been varying with the sub sector with the maximum being in the road and the port sector. The rail sector has been very resistant to the reforms. Recently, it is facing political pressure for change.
2. The level of private participation has increased in recent years in the consultant services and civil works. The participation has not increased much in infrastructure.
3. In the infrastructure sector, the desired targets have not been reached because of lack of institutional capacity for implementation. Also, there have been problems in mobilizing resources.
4. In the last decade, there has been more attention paid to expanding the infrastructure rather than improving the current infrastructure.
5. There have been delays in the implementation of various plans. The delays have very high economic costs.

6. According to World Bank (*Bansal et al, 2002*), India has a very opportune period for reforming the transport in India. These are due to the following factors:
  - India has made various reforms in the past years and has set up the initial momentum to reform the sector.
  - There are various successful models available from the other developing and developed countries from which India can learn and adapt.
  - Also the principles behind the management and development of the sector are changing. For example, there has been emphasis on managing the transport sector as a business rather than a public service; Competition has been introduced between the transport sector and more and more private sector participation has been encouraged.
7. India has faced political constraints in implementing the reforms. The political pressure has diverted the resources to just fulfill the needs without ensuring sustainability or strategic implementation.
8. The success of the future reforms would depend on two important factors:
  - The political will to reform
  - The participation of the various stakeholders and pressure groups to initiate the change.
9. Before critical level is reached in the level of private sector participation, public sector is mainly responsible for maintaining the infrastructure for India. Thus in the short to medium term, it is important to improve the public sector performance and accountability.

Based on the past reforms and the lessons learnt from these reforms, World Bank and the Asian development Bank has suggested some important reforms for the road and the rail sector.

### **3.4 Suggested Reforms**

World Bank (*Bansal et al, 2002*) suggested various reforms for improving the sector for short to medium term. These include:

1. There should be a formation of an expert team within the Transportation Ministries. These will be responsible for formulation and proposing of the strategic decisions.
2. Public sector should be given attention for improvement since this is the main sector in providing and managing most of the infrastructure projects.
3. Private sector should be given importance and the public sector should be given due importance before private participation reaches a critically high level.

Specific suggestions have been granted for different sectors by agencies such as the World Bank and the Asian Development Bank.

#### **3.4.1 Suggested Reforms for the Highways**

World Bank (*Bansal et al, 2002*), has made specific suggestions for the highway sector which include the following:

1. The NHAI (National Highway Authority of India) should be given greater authority in terms of human resource management and also be given more financial autonomy. This may help in opening new avenues for private finance.
2. MORTH should be restructured to have a better management and retooling of the staff so that it could act as a monitor of road agency performance. The ministry should control the state road agencies and provide them strong incentives to perform as the Federal Highway Trust in United States (*US Department of Transportation, Financing Federal Highways, 1999*)

3. In order to develop the expressways in India, the government should plan on the innovative ways for alignments and the pre-construction activities. These massive highways can be developed through innovative ways of resource mobilization. The below box shows the various models by which China has brought the private sector to the highway sector.

**Box 3.2 Highway financing in China**

- **Cooperative joint venture-** This is a unique model where the public partner is in charge of the major commercial and the construction risks. They also share the operation and the maintenance of the toll collection. This model has been used to invest about \$12 billion in about 80 projects.
- **Long Term Debt Secured in the International Markets-** This is very limited due to the absence of the proper regulatory and the legal framework.
- **Securitization of existing assets-** In this method, the provincial shareholding expressway development company is responsible to leverage the available assets and to generate the immediate revenues in order to raise equity capital on the domestic markets.
- **BOT (Built, Own and Transfer) -** This is limited in china due to a number of policy reasons such as absence of procedures for bidding or land acquisition etc.
- **Private mainland toll road company-** This concept was successfully implemented by a company known as the Shanghai Midway Infrastructure Holding Ltd. It used four existing secondary toll roads in one province for expanding two toll roads in another province through the concept of private placement in the equity market.

*(Source: PPI Initiative in China, Transport sector, World Bank, July, 1999)*

4. The states should implement ways in order to improve their resource mobilization by:

- Exploring options and implementing ways to achieve greater cost recovery (for e.g. through road funds, tolling, leasing of assets and charging for access to right-of-ways)
- Resolving the existing legal and regulatory issues, which hinder the private sector finance.

5. The state road agencies need to improve their asset management systems. This will require innovative techniques for improving the data collection, analysis and information management. The planning and budgeting of the works has also to be improved by using information technology and other advanced techniques. Proper steps should be taken to reduce corruption and focus should be placed on increasing the transparency and accountability in contract administration.

6. In the longer run, the state road agencies should focus on tackling the harder issues.

These include the following:

- Restructuring the human resource policies and practices in order to make them appropriate for the private sector terms and conditions of service.
- Privatizing the commercial services and keeping a distance from the government should achieve greater autonomy.

#### 3.4.2 **Suggested Reforms for the Railways**

The reforms suggested for the railroads are as follows-World Bank (*Bansal et al, 2002*):

1. “*The Indian railways enterprise should be separated from the government’s policy, regulatory and the social support functions*”-(*Bansal et al, 2002*)- This means that the railways should be corporatized and the government should function in the appropriate ministries.

2. The Indian Railways should be viewed as a business rather than as a social service
3. The railway organization should be a mix of several factors and objectives- This includes the geography, market location and the dispersion, balance of passenger and the freight traffic, competition within various modes, and the different roles of the public and the private sector in providing the rail services and the assets.
4. There should be a differentiation between the core and the non-core activities. This would help the management in focusing on the core activities.
5. There should be steps towards rail restructuring. There exist various methods for rail restructuring. These include the infrastructure separation, private investment in the operating companies etc. Below is an example, which illustrates the establishment of a leasing company for leveraging the unencumbered assets

### **Box 3.3 Sale and Lease Back- Leveraging Unencumbered Assets**

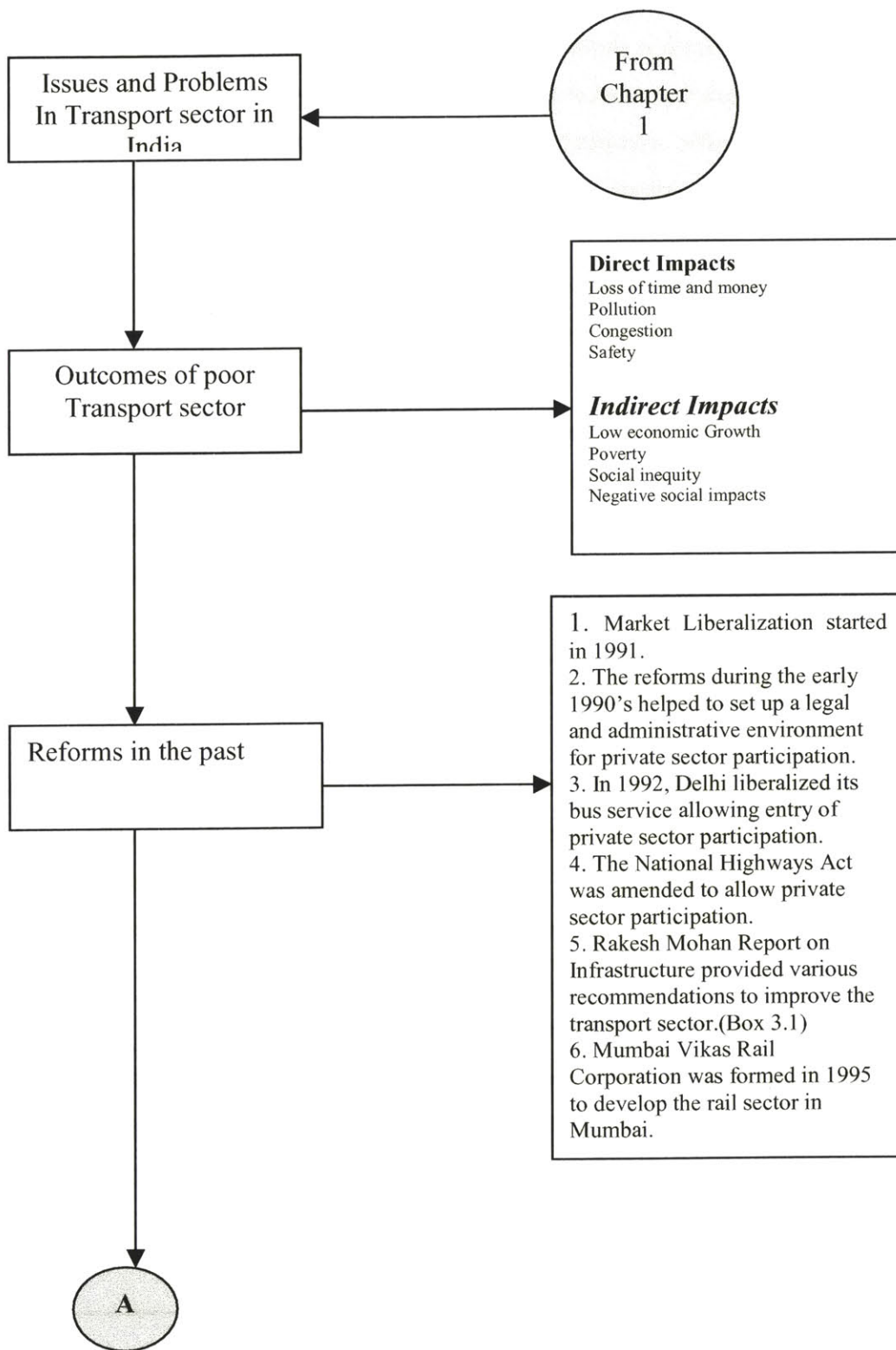
Indian railways could work with various leasing companies to sell the unencumbered rolling stock with back-to-back leasing to the railways. This would help the railways to get capital for rehabilitation, up gradation and expansion of the fixed infrastructure. Such a joint venture for the leasing would have two advantages

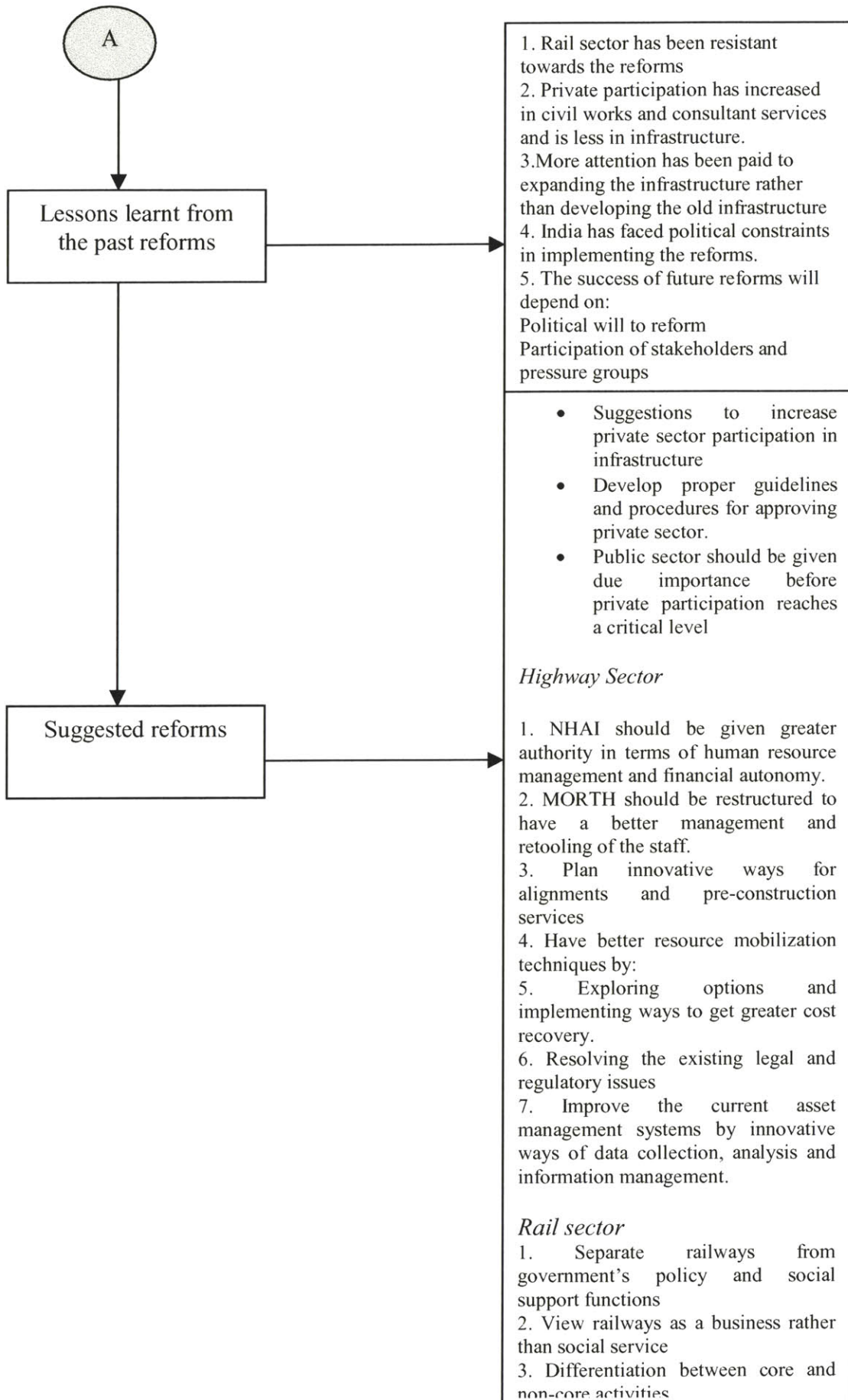
- First, this lease acts as a normal lease.
- Secondly, it helps the railways in conditions of uncertain demand because the railways could use the equipment as and when required. The risk of the technological obsolescence and lower use of the rolling stock is borne by the leasing company.

*Source : (Bhattacharya, et. al, 1997)*



**Figure 3.1 Summary of the present chapter**





Thus Figure 3.1 summarizes all the important points of the chapter.

## *Chapter 4*

### *Experience with Public/Private Partnerships: Country Studies and Case Studies*

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The current chapter presents studies of public private partnerships in four countries and two case studies of PPP in India. The purpose of the country studies is to identify the different transportation issues and problems faced in these countries and generate a framework for the important issues to be kept in mind while implementing private participation in the private sector in India. The countries chosen for the study are:

- People's Republic of China
- Philippines
- Malaysia
- Thailand

These countries have been chosen because of the following similarity with India with regard to the transport sector:

- The transport sector is in the developing stage
- Private participation has been low in the transport sector
- The transport sector faces problems like congestion, high accident rate as compared to the other developed nations.
- Majority of the transport projects are under the public sector.

The case studies chosen are Bandra-Worli Sea Link and Airoli Bridge, two examples of private sector participation in significant projects in India. The success of these projects would help in determining the success of the future projects.

#### **4.1 Country Study 1- People's Republic of China (PRC)**

PRC is developing the transport system in order to modernize the economy. Currently, PRC depends on the rail system for the transport and the road system is not much developed. Most of the roads are single two lane carriageways. The average speeds are low and the accidents are frequent. The major responsibility of the road sector has been on the public sector. According to *Asian Development Bank (2000)*, the road projects are funded from the combination of:

- The state
- The provincial budget-taxes and the user charges

The demand for road transport is on increase. In 1980, road passenger transport had a share of 32 percent of the total traffic and the freight transport had a share of 6 percent. This demand grew to 55 percent and 14 percent respectively in the year 1997 (*Wood, 2002*). In order to meet the demand, new infrastructure is planned. Due to the scarcity of the public resources, the investment gap must be filled by the private sector.

##### ***4.1.1 Legal and the Institutional Framework***

According to *Wood (2002)*, following points are important in the legal and the institutional set-up:

1. The present legal and the administrative set-up represents a transition from the State Owned Enterprise (SOE) to a mixed system. The mixed system is based upon the share companies get to the outside investment as well as to carry out the socialist market economy.
2. In practice, the process of moving away from SOEs has been slow for the highway sector.

3. In order to attract the international private sector to invest in the companies (the concessionaire), the framework has to be restructured. The framework has to be made more autonomous with the operations and decision making accountable to all owners.
4. Presently, there are no coherent laws and regulations regarding the toll road projects. The Highway Law as issued in 1997 and the notices and the orders issued by the Ministry of Communications and State Development Planning Commission conflict in some areas. For e.g. the maximum time of the concession is different in the two notices-in one it is 20 years and in the other it is 25 years.

#### *4.1.2 Private Sector Financing of Roads in PRC*

Private financing of the tolls roads is based on the following four instruments (*Wood, 2002*):

- Joint Ventures
- Securitisation
- The domestic Bond Market
- Commercial rate loans from the Chinese Banks

According to *Asian Development Bank (2002)*, most of the concessionaries are the cooperative joint ventures, which provide the flexibility in the allocation of rights and objections between the local, and the foreign partners. Approximately 2,800 kms of the expressways are in the hands of the private sector. This raises a capital of about 5- billion US dollars of private capital. Most of the concessions are of the form of leasing or Buy-Operate-Transfer. The developer usually pays an upfront fee and then develops the further part of the network.

#### *4.1.3 Key issues for the Toll Roads in PRC*

1. According to *Wood (2002)*, the biggest issue facing the future private investment for the toll roads is the low traffic volume. Most of the roads for leasing and

concession have volumes that are too low for supporting the investment. A study formulated by ADB in 1999<sup>1</sup> examined the performance of toll roads constructed where there are parallel non-toll roads. In order to maximize the revenues from the toll roads, the parallel roads need to be tolled and both the new and old roads have to be monitored by one company.

2. According to *Asian Development Bank (2002)*, the traffic in China is very toll sensitive. For the situation where there are the parallel non-toll roads, the traffic is dramatically affected by charging the tolls. The carriers with short distances to travel are less time sensitive and prefer to use the non-toll roads. Also, there has been an early resistance to the tolls.
3. According to *Wood (2002)*, the toll rates are close to the toll rates of the developed nations (about 3 to 6 cents per vehicle Km). The average earnings are far less than the developed nations and thus the real toll rates become very high.
4. According to *Asian Development Bank (2002)*, there are concerns with the asset Securitization. An existing asset is often used to raise funds from the foreign investors. The construction risks are taken by the public sector and the government can access additional financing readily while the chances of returns from the tolls are high for the private sector. This may lead to two problems:
  - The assets may be over-leveraged
  - The capital market may not be a secure funding in the light of the recent crises. This is a very serious issue in the present market.

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<sup>1</sup> ADB TA NO. 3102-PRC Chongqing-Guizhou Expressway Project Preparation (Part 2: Toll Diversion Study), TRANSPORT PLANNING AND REASERCH INSTITUTE, TONGJI UNIVERSITY AND BULLPIN Pty Ltd, December 1999.

5. According to *Asian Development Bank (2002)*, development has been delayed by the credit-worthiness and commitment of the public entities. This has increased the costs due to the resulting risks

## 4.2 Country Study 2- Philippines

The Philippines have a total road network of about 160,000 km in length. The Department of public works and Highways (DPWH) administrate the national roads, which are about 27,000 km in length. The rest are administrated by the Local Government Units (LGU's). The toll roads are about 140 km in length and are supervised and regulated by the Toll Regulatory Board (TRB), which is a public agency, attached to the Department of public works and the Highways. TRB is in charge of the construction, operation and maintenance of the toll roads and make decisions on the various policies and regulations regarding the toll facilities (*Santos et al, 2002*)

Following are the existing toll roads (*Santos et al, 2002*):

1. North and South Luzon Expressways (NLE and SLE): the department of public works and Highways in late 1960's constructed these. These two expressways connect Manila with other economically developed regions in the country. Under the Presidential Directive 1113, CDCP was granted a 30-year franchise for the construction and the maintenance of the toll facilities for Luzon expressways. In 1983, PNCC was given a 30-year franchise for the tolling facilities for the North and South Luzon expressway. The franchise also gave "*the right, privilege and authority to construct, maintain and operate any and all such extensions, linkages or stretches from any of these expressways.*" (*Asian Development Bank, 2002*)
2. Radial Road 1 (R-1) Expressway: This 7.6 km road connects Cavite and Manila. Initially built as a free road, the road was rehabilitated as a toll road in



1997. The toll road was opened in May 1998, but the toll collection was forced to cease after one day. The collection of the toll was started again in July 1998.

3. Portion of the Metro Manila Skyway (MMS): This is a 35 km elevated road, which is under construction and would connect the North and the south Luzon Expressways. The road is a project under the concession among the government, Philippine National Construction Corporation (PNCC) and Citra Metro Tollways Corporation (CMMTC).

#### *4.2.1 Legislative and Institutional Framework*

As per the information gained from the *Asian Development Bank (2002)*, the first BOT law was passed in 1990 and the amended version was passed in 1994 with the salient features: (*Republic Act entitled “ An act authorizing the Financing, Construction, Operation and Maintenance of Infrastructure projects by the private sector, and for Other Purposes”*):

1. The responsibility for the identification of priority BOT projects is taken by the Government Line Agencies.
2. There should a very transparent procedure for bidding and contract award.
3. All the projects should be submitted to the Investment Coordination Committee (ICC).
4. The National Economic and Development Authority (NEDA) chair the ICC.
5. The unsolicited projects should be dealt with the following formal procedure:
  - A feasibility study should be submitted to the line agency, which can then endorse it and pass it to the ICC. The ICC evaluates it and the promoter makes a presentation to ICC.

- There is no requirement of a government support or equity.
- The competitors are subject to the price matching in which they are allowed to compare their prices with the competitors and then proceed with the implementation.
- The tolling certificate is issued by the TRB and then the Department of public works and Highways is responsible for implementation issues.

#### ***4.2.2 key Issues in Philippines***

1. Ambiguity in the Roles of DPWH and TRB: According to (*Santos et al, 2002*), the roles of the two agencies are not very clear. In the early year, it was not clear which agency is responsible for handling the evaluation and which is responsible for handling the government negotiation panel. A project known as the STAR was bid in 1997 and it was not clear as to which office would implement the project.
2. According to *Asian Development Bank (2002)*, most of the projects are funded by the private sector because of the lack of sufficient public funds. Tolls are used to finance roads and not for traffic management.
3. Need for more Expertise in the DPWH: According to (*Santos et al, 2002*), DPWH has to develop its expertise in terms of finance, applied economics, and law and on the art of negotiating.
4. According to *Asian Development Bank (2002)*, there is an absence of investment for project preparation. Project preparation is a very important since it helps in maximizing the private participation and helps in finding out the consequence of the project.

5. According to *Asian Development Bank (2002)*, there has been opposition of the national Government by the Local Government regarding toll road policies and the setting of the toll rates.
6. Setting/Formulation of Toll Rates and Toll Adjustment Formula- According to *Santos et al, 2002*, this situation arose during the evaluation of unsolicited projects. The formulation of the toll Adjustment Formula took a long time since toll is a function of project costs, revenues to be generated, financial arrangements and projections, risks involved in the project. There was no framework to determine the project risks.
7. Risk Allocation: According to *Santos et al, 2002*, the general policy is to assign the risk to the party that has greater control over the risks. Some of the risk is passed to the government through the traffic diversion model.

### **4.3 Country Study 3-Malaysia**

The overall plan for the toll roads in Malaysia consists of 25 highways, which total to 1,800 km in length. At present there are 13 highways total to 1,200 km in length (*Hassan, 2002*).

According to the *Asian Development Bank (2002)*, the Malaysian experience can be summarized as follows:

1. The first project –the North South Expressway (NSE) was very successful.
2. A large number of projects have been completed and also various projects are in the pipeline.
3. There is an absence of a transparent legal framework for the private sector involvement. This means that the laws regarding the toll rates, concession period, risk sharing between the public and private sector are not clearly defined and vary from project to project.

4. There has been a limited Government involvement in the process of project identification.

According to *Asian Development Bank (2002)*, the Malaysian experience has been greatly influenced by the first project: the NSE. Initially, it was designed as a public project but then in 1980's it was restructured as a BOT project. The overall impact of the project has been very positive on the economy and the society of Malaysia. The project has been very successful because of the government support in terms of the assets and the revenues. Almost all the projects in Malaysia require the Government support because of the following reasons:

- The contractors have very little interest in the economic, environmental and social impacts of the project. They are more profit oriented.
- Some projects have been developed without the consideration of their network consequences.
- Lack of the BOT law and there is little or no transparency in the system of project identification and procurement.
- The debts are domestic and the Government rather than the banks shares the risks. This is due to the fact that the Government guarantees the loans through the concession agreements.

#### ***4.3.1 Legislative and Institutional Framework***

According to *Asian Development Bank (2002)*, there is not a clearly defined law in Malaysia for the toll road projects. Instead the following procedure is used:

1. The private group or the company prepares the project up to the pre-feasibility level and passes it to a government organization known as the Economic Planning Unit (EPU) that then approves it.

2. EPU convenes a financial and a Technical Committee for a formal review of the full feasibility study. Also EPU has developed some clear policies for the sector:
  - Provision of a parallel free road.
  - The social equity is promoted by encouraging the public transport to use the expressways. This reduces the tariff on the buses.
  - There is a separate track for the motorcycles, which is used by the low/middle income group.
3. The concessionaires may also prepare a detailed design before the approval.
4. The Department of Environmental Approval conducts the environmental impact assessment.

#### ***4.3.2 Key points for Malaysian Experience***

1. Malaysia has received a great amount of success in terms of the completed projects under the private entrepreneurship. The private sector has been good in carrying out the assigned functions. Most of the risks is carried by the Government sector as compared to the private sector.
2. The projects have seen much innovation and new technologies because of the private sector participation. The social and the economic impact of the whole process is not judged because of the short period of time.
3. In terms of the framework, there is no transparent BOT law and there are no published procedures. Government has helped the private sector by giving long-term finance and traffic guarantees.
4. The profits come mainly from the construction of the projects and also from the Kuala Lumpur Stock Exchange Project Listing. The money from the tolls is rarely made and a strong government support is required for that.

#### **4.4 Country Study 4 –Thailand**

Presently, Thailand has toll roads of total length of 300 kilometers in and around Bangkok. All of these roads are expressways. The concession road law has been since 1930 under the Department of Highways. Only two short roads were built by the private sector in 1950's. The concession ended in 1970's and these were transferred into public roads by the government (*Wanisubat, 2002*).

According to *Asian Development Bank (2002)*, in 1970's, the Government developed the First Stage Expressway system. In 1980's Government encouraged the private sector and individual government agencies were encouraged to contact BOT expressway and mass transit projects. This resulted in the Second Stage Expressway. These projects were not well coordinated, which lead to various conflicts because they used the same airspace.

Various significant changes took place in the 1990's, which included the following:

- The Anand Government (1993) required compensation to be paid for land at market rates. Due to this action, the Government cost increased significantly for large-scale transport projects.
- A Royal act was passed in 1993, which created the framework for the private sector participation.

##### ***4.4.1 Legislative and Institutional Framework***

According to *Asian Development Bank (2002)*, various Government agencies share the responsibilities. There has been a history of the institutional conflicts. No clear procurement policy exists for the projects and Government had made guarantees for some projects on an *ad hoc* basis leading to unrealistic expectations form the bidders. No clear policy exists on the toll rate increases and causes a major concern to the investors. For the early projects there have been no competition and the procurement process have not been transparent with major problems such as corruption.

#### **4.4.2 Key Issues**

According to *Asian Development Bank (2002)*, following are the issues with the Thailand toll roads:

1. The main problems with the Thailand expressways are that they do not help in solving the traffic congestion problem.
2. The projects have not been well planned and there is a large portion of the expressway, which has been left unused.
3. The procurement process has not been well defined, which led to substantial delays, resulting in losses for the participating private sector companies.
4. Also the planning process should be well defined. For e.g. Government identified the projects in Bangkok but due to the lack of the proper planning there was no coordination.
5. There is no clear transparency in the bidding process. Due to this, both the local and the foreign bidders are deterred from bidding.

#### **4.5 Key Issues and the lessons learnt from various country studies**

The various issues identified by the *Asian Development Bank, 2002* from the discussed studies are as follows:

1. *Planning and institutional issues*: It has been seen that the countries with a well-developed toll road network have a well-established strategic planning network whereas the other countries with less developed network have a weak-planning framework. A strategically sound planning network is important for optimizing the benefits and minimizing the cost of the road development network.

2. Legal and Regulatory Framework: For toll roads to be successful there is a need for well-drafted laws and regulations for private sector participation in the toll road projects. Most of the developing countries do not have well-defined laws as opposed to countries like United States and Japan. The concession laws have to be well defined and the government should be able to provide the basic legislative and regulatory authority to the private sector. The legislation may be general as in the Philippines where the legislation applies to different types of concessions or very specific, allowing only a particular concession.
3. Clear Bidding and selection Procedures: The bidding process should be simple and should be transparent. It should be competitive and should reduce government support so that the residual risk for the government may decrease.
4. Concession contract should be unambiguous: As in the Philippines the concession contracts should be unambiguous and the risks involved should be clearly defined. It is preferable that a model concession should be designed in order to increase the fairness and clarity for the negotiations between the public and the private sector.
5. Government Support: The amount of Government support has to be determined for a particular project and it would depend on the economic and the political framework of the country. The public sector should also keep in mind the large contingent liabilities.
6. Traffic Forecasting: The precise traffic forecast is an important factor in the success of a particular project. Traffic forecasting should take into consideration the impact of the land use and other social and economic factors. The parameters of the forecasts should be calibrated according to the different countries and different regions. The lack of the technical expertise and the budgetary constraints may lead to erroneous forecasting and hence to the failure of the project.



7. The adjustments of the toll rates: As seen from the various country studies, the toll rates should be appropriate to the respective countries and should be able to generate sufficient traffic in order for the project to be viable.
8. Public Acceptance to the tolls: This is an important and is made clear by the country study of People's Republic of China. The public acceptance of the toll relates to the issue of land acquisition and resettlement.

Above are the important issues, which should be considered for the development of toll roads.

#### **4.6 Case Studies: Transport Projects in India involving Private Sector Participation**

This half of the chapter presents two case studies demonstrating the implementation and success of the private sector participation in the Transport sector in India. The studies chosen for the case are:

1. Bandra-Worli Sea-Link
2. Airoli Bridge

Private participation has been very rare in India in the Transport sector. There have been few significant projects involving the private sector. These projects provide a chance for the private sector to prove their worthiness in completing big projects in India.

### **4.6.1 Case Study 1: Bandra-Worli Sea Link**

#### **4.6.1.1 Background**

The data and the information about the project have been obtained from the Maharashtra State Road Development Corporation<sup>2</sup>. This is an important case since the project is one of the most ambitious transport projects in India in the past thirty years. The estimated cost of the project is 650 crores (1.3 billion dollars) for a length of about 5.6kms. The financing of the project was handed over to the Infrastructure Leasing and Financial services (ILFS) Ltd.

Mumbai has been the industrial capital of India and is surrounded by water on three sides. Figure 4.1 provides a map of Mumbai explaining the Geographical location and conditions of Mumbai. Presently, Mahim Causeway is the only link, which provides a connection between the western suburbs and the islands of Mumbai. Due to this single link providing all the access, the north-south corridor is heavily congested from the formation of a bottleneck at the Mahim Causeway. In order to control this situation, an additional link is being developed which is known as the “Bandra-Worli Sea Link”.

#### **4.6.1.2 Project description**

The project starts from the interchange at the Mahim intersection at Bandra and ends at the Khan Abdul Gaffar Khan Road (KAGK) towards the Worli end. The overall length of the project is 5.6 Kms. The project envisages constructing a one Km. road from Khan Abdul Ghaffar Khan road at the end of Worli. Further, a cable-stayed 1.2 Km long bridge is built over the Sea ending at Land’s End at Bandra. The entire project has been divided into the following five parts;

Package 1: construction of flyover over Land Grove junction at Worli

Package 2: construction of cloverleaf interchange at Mahim Intersection

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<sup>2</sup> Maharashtra State Road Development Corporation (MSRDC)-[www.msrdc.com](http://www.msrdc.com)

**Figure 4.1 Map of Mumbai**



(Source: <http://www.mumbainet.com/cityinfo/citymap.htm>)

Package3: construction of an approach road from Mahim intersection up to the toll plaza on the Bandra side.

Package 4: construction of a cable-stayed bridge.

Package 5: improvements along the Khan Abdul Ghaffar Khan Road.

### *Salient Features of the project*

- The link connects western Expressway at Mahim junction to Khan Abdul Gaffer Khan road
- The link has eight lanes with limited access for the exclusive use of the fast moving vehicles.
- There is a viewer gallery at the top of the central pylon at 150m height with access via capsule lift from pile cap.
- Advanced Traffic Control and surveillance system with emergency crossovers and Disaster Management Program.
- Planning of a modern Plaza with has 16 lanes with automated toll collection system.

The Techno feasibility study of the project was completed in 1986 by MSRDC<sup>3</sup>. The study suggests that the fuel savings would be worth Rs 100 crores per annum and the savings in the travel time would be up to 20-30 minutes. The study showed that the reduction in the levels of NOx and Co would be 43% and 75% respectively. The following Box compares the existing situation and the situation after the link is completed.

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<sup>3</sup> Maharashtra State Road Development Corporation (MSRDC)-[www.msrdc.com](http://www.msrdc.com)

#### **Box 4.1 Saving by the use of the Bridge**

##### **Existing Situation:**

Distance from Lovegrove junction to Mahim Junction=7.7 Km

No. of Traffic signals=23

Travel time; Morning peak hour= 35 min; evening peak hour= 38 min

Average Journey speed = 13 Kmph

##### **Savings due to the Link**

Direct Cost Savings =Rs 14.11 per car (50 Rs~1\$)

(Fuel, tyre, wear and tear, lubricants etc)

Travel Time savings= 29 min per car

Time value @Rs 100/hr= Rs 48.43/car

**Total savings = 62.59/car**

*(Source: www.msrdc.com)*

Based on the above figures, a toll, which is less than Rs. 62.59, is feasible for particular user. The Mumbai Metropolitan Region Development Authority (BMRDA) and ILFS carried out the financial feasibility study of the project proposal jointly. The study primarily aimed at the ‘*Sensitivity level*’ of the toll i.e. determining what would be an optimum toll rate which would allow the concessionaire to have the required financial benefits and the users to have the required economic benefits.

The Project is a very significant project, which would turn out to be a landmark for the city of Mumbai. Consultants believe that the link would be a signature structure for Mumbai like the Sydney Opera and Golden Gate Bridge in San Francisco. The pollution in the city is also very high –Transport sector contributing about 64% of the total pollution. The link will help in reducing the level of the pollution in the area.

#### ***4.6.1.3 Need of the Project***

According to MSRDC<sup>4</sup>, the problem of congestion became an acute problem along the western corridor due to:

- Overcrowding of public Transport system.
- Limited road capacity with no scope of widening
- Increasing ownership of vehicles.

Various recommendations were made for easing traffic. A high level committee, under the chairmanship of chief secretary Mr. Paranjee, was appointed to go into the question of easing traffic congestion in Mumbai. Various measures were suggested which included:

- Allowing only north to south traffic along Senapati Bapat Marg during the morning peak hours.
- Allowing only South-North traffic along Gaffer Khan Road and Veer Savarkar Road during evening peak hours.
- Extending Senapati Bapat Marg towards Bandra up to Turner road constructing a bridge across Mahim bay and a subway under Western Expressway.

The first option only provided for partial relief in the congestion in the Worli-Bandra section, and it required the displacement of the people living in the nearby areas. Also many railway stations (with grade crossings and the traffic on it) were interfering the Senapati Bapat Marg in the smooth flow of the traffic. These problems necessitated the need for an additional link and were found in the form of the Bandra-Worli Sea-Link.

#### ***4.6.1.4 Economic and Financial Feasibility of the Project***

The private sector costs included the following:

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<sup>4</sup> Maharashtra State Road Development Corporation (MSRDC)-[www.msrdc.com](http://www.msrdc.com)

- Construction cost of the facility
- Construction of the toll plaza
- Maintenance cost of the road
- Maintenance cost of the toll plaza

*The private sector benefits included the following:*

- Increase in the property value: This is obtained by taking the difference in the land value of the region before and after the facility has been constructed.
- Toll revenue with profit till the redemption period.
- Commercial exploitation: An amount of RS. 35 crores per annum was considered as the benefit due to commercial exploitation say advertising.

*The public sector costs included the following:*

- The costs borne by the government for the initial capital outlay.
- Costs of plan review and field inspection taken as 5% of the total project cost.
- Cost of maintenance after the transfer of ownership from the private sector to the government.
- Costs of providing new provisions arising from and incidental to construction of the main project.

*The public sector benefits included the following:*

- Value of land: If the region surrounding the facility is under the ownership of the Government, the increase in cost of the land due to the facility will be a benefit to the public sector.
- Increase in mobility of the road user.

A methodology was developed by the research group, which found out the economic and financial feasibility of the project and then compared the public and the private sector. In the methodology, the total revenue collected from imposing tolls based on traffic forecast equaled the total private sector costs and then a redemption period (the time interval after which a borrower may reclaim the title and possession of property by paying the secured debt) was forecasted. The economic feasibility considered the Net Present Value, Benefit Cost Ratio and the Internal Rate of return.

They used an analysis of 20 years and three cases were considered, based on different toll charges as shown in Table 4.1.

**Table 4.1 Toll charges in Rupees**

Case	Bus	Car	Truck	Two wheeler
1	5	4	7	2
2	6	5	8	3
3	4	3	5	2

*(Source: Dhingra S.L, et.al, 1993)*

The following results were obtained which by the group (IIT Bombay) giving the IRR, and B/C ratios of the different cases. The following tables summarize the results.

**Table 4.2 Results for the public sector (no private sector involvement)**

Case	IRR (%)	B/C @20% discount	Redemption period in yrs
1	22	1.02	15
2	30	1.04	15
3	25	1.3	18

*(Source: Dhingra S.L, et.al, 1993)*



**Table 4.3 Results for the private sector participation**

Case	IRR (%)	B/C @20% discount	Redemption period in yrs
1	30	1.9	10
2	42	2.4	10
3	38	2.5	11

(Source: Dhingra S.L, et.al, 1993)

The group summarized the results as follows:

1. The optimum tolls were found out to be;  
Car: Rs 5; Bus: Rs 6; Truck Rs: 8; Two wheeler: Rs: 3
2. From the sensitivity analysis, it was found out that as the toll charges increase, the redemption period decreased. This provided the ground for increase in benefits for private sector that is attributed good return in the form of IRR.
3. The IRR and NPV values were found better for the private sector than the public sector suggesting the participation of the private sector.
4. The redemption period for the public sector participation was higher compared to that of the private sector because the private sector was able to charge more tolls.
5. The results concluded the conditions of the project were feasible for the private participation in terms of the economic and the financial issues.

### **Comments**

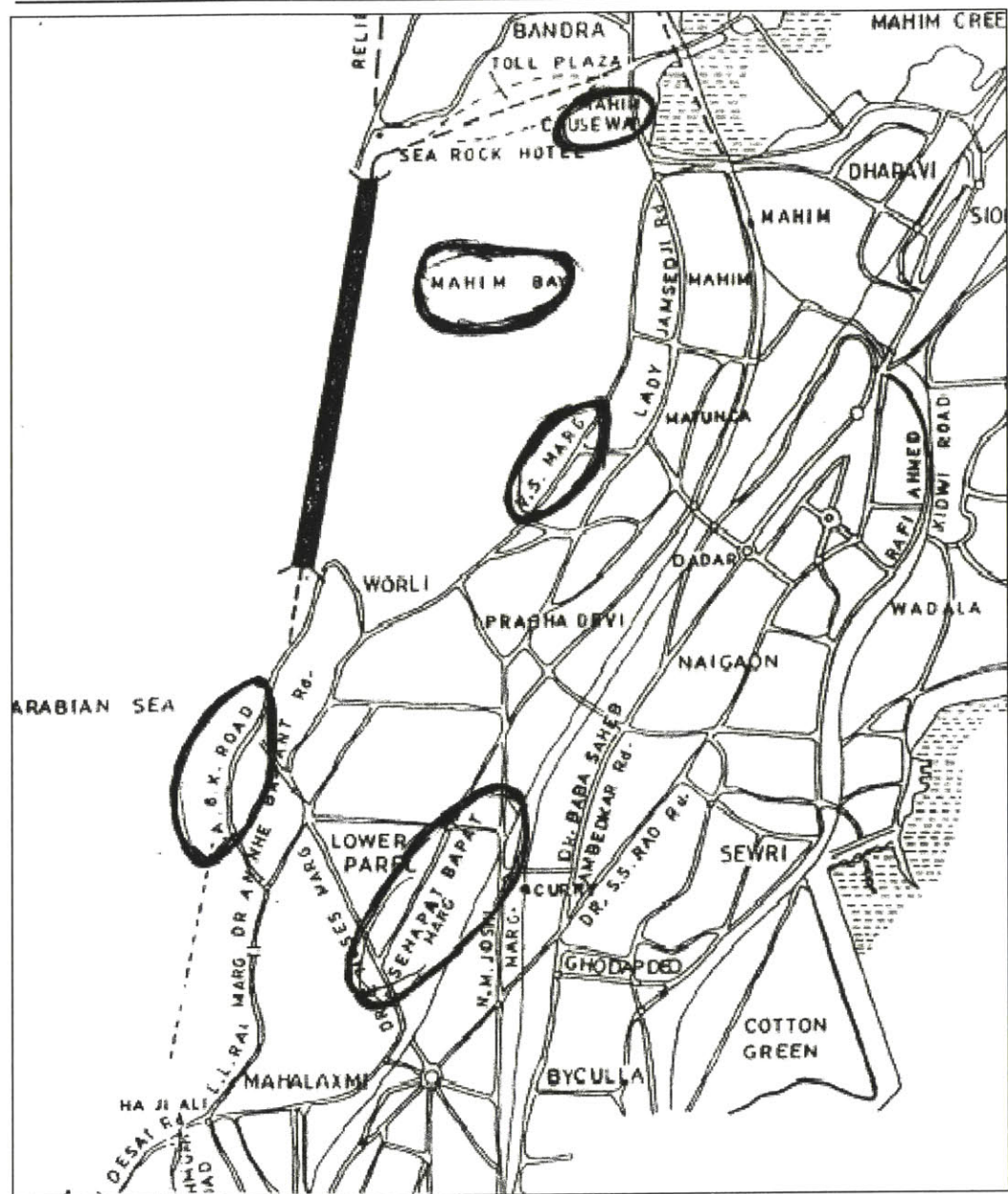
1. The project provides a study to show the implementation of the private sector participation in the mega-projects.
2. The success of the project would affect the future involvement of the private sector participation in the transport sector.
3. The research group at IIT Bombay has conducted the study incorporating both the economic and the financial parameters and provides an example where the private

sector has been shown to be effective than the public sector. This is due to the fact that the private sector is able to charge greater tolls than the public sector.

The important points regarding the methodology are:

- a). There have been various assumptions involved in the study which might change the results significantly.
  - b). The methodology has not been compared with other methodologies and it is important to involve the economic and financial parameters in an exhaustive way.
  - c). The methodology encompasses only the economic and the financial feasibility parameters but the legal and administrative policy issues have not been considered.
4. The study provides a sound base indicating the economic and the financial feasibility of private sector participation in transport sector in India.

Figure 4.2 Bandra-Worli Sea Link Project



(Source: Dhingra S.L, et.al, 1993)

## 4.6.2 Case Study 2 Airoli Bridge- A link between Mumbai and Navi Mumbai

### **4.6.2.1 Background**

Airoli Bridge is an important project since it connects the suburbs of Mumbai to Navi Mumbai, which is one of the largest special economic zone planned in India. It is spread over an area of about 44 square kilometers. Currently, it has a population of approximately 1.2 million, which is likely to increase to about 2 million by the year 2008<sup>5</sup>. The government of Maharashtra has recognized Navi Mumbai as one of the most strategically important locations because of its existing linkages to the city of Mumbai. In addition to this, the city is located close to other industrial centers such as Pune, Thane, and Vapi etc. Due to these reasons the road links between Mumbai and Navi Mumbai and the Airoli Bridge are very important.

### **4.6.2.2 Project Background**

Airoli Bridge gives a direct access from the suburbs of Mumbai to Navi-Mumbai. The important feature is that it is the first project of such a scale taken as a toll project and raising the funds from the financial institutions. The project was started by the City and Industrial development Corporation of Maharashtra (CIDCO) in 1994. The project was taken over by the MSRDC (Maharashtra State Road Development Corporation) in August 1998. The project was formulated with the primary motive to encourage the private sector participation in the construction and maintenance of the road by mobilizing and deploying their own resources. The project investor was expected to recover the total capital outlay including interest on the capital, cost of repair and maintenance as well as toll collection from the levy of toll on vehicle users.

The Location of the project is indicated in the following map. This bridge establishes a road link connecting Thane-Belapur road and eastern express highway. The project consists

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<sup>5</sup> Maharashtra State Road Development Corporation (MSRDC)-[www.msrdc.com](http://www.msrdc.com)

a bridge of length 1030 meters and about 3 Kms of approach roads. The project also included a minor bridge, underpass, toll station, landscaping, and street lighting etc. The project started in January 1994 and was completed on 1<sup>st</sup> April 2002. The cost of the project was about 160 crores including the interest during the construction<sup>6</sup>.

**Figure 4.3 Airoli Bridge**



(Source: <http://www.maharashtraitparks.com>)

#### ***4.6.2.3 Important features of the Project***

1. The precast girders have been placed for the first time in the country.
2. The toll station is well planned which includes amenities such as first aid center, fuel station, public toilets etc.
3. There is a proper illumination along the corridor with appropriately designed lightening arrangement.

<sup>6</sup> City and Industrial Development Corporation of Maharashtra-[www.cidcoindia.com](http://www.cidcoindia.com)

4. The bridge has reduced the travel distance by 9-10 kms and relieved the pressure on the existing Thane creek bridge and Kalwa bridge.

The private sector investments in Airoli Bridge comprise the following:

- Construction cost of the facility: This project was proposed to be categorized under pure private sector funded project. The construction cost was estimated to be about 6 crores.
- Construction cost of the Toll Plaza: This was taken as 10% of the total cost project. (CIDCO)
- Maintenance cost of the facility: It was taken as 5% of the construction cost of the facility and amounted to Rs 13,00,000 per annum
- Maintenance cost of the toll plaza: CIDCO determined the maintenance cost of the toll plaza to be 4% of the construction cost of the facility.

#### ***4.6.2.4 Economic and Financial feasibility of the project***

The research at IIT Bombay headed by Prof. S.L Dhingra analyzed the financial and the economic feasibility of the project. The same methodology was used as used in the Bandra-Worli Sea Link project. They considered three cases with different toll prices, which are indicated, in the following table. The analysis period considered was 20 years.

**Table 4.4 Toll charges in Rupees**

Case	Bus	Car	Truck	Two wheeler
1	5	4	7	2
2	6	5	8	3
3	4	3	5	2

*(Source: Dhingra S.L, et.al, 1993)*

Following results were obtained for the Airoli Bridge:

**Table 4.5 Results for the public sector (without private sector involvement)**

Case	IRR (%)	B/C @20% discount	Redemption period in yrs
1	20.36	1.09	11
2	20.92	1.21	11
3	34.25	1.18	11

*(Source: Dhingra S.L, et.al, 1993)*

**Table 4.6 Results for the private sector participation**

Case	IRR (%)	B/C @20% discount	Redemption period in yrs
1	34.59	1.194	5
2	34.96	1.196	5
3	34.25	1.191	5

*(Source: Dhingra S.L, et.al, 1993)*

Summary of the results found out by the research group:

1. From the trial run of the sensitivity analysis carried out, it can be said that the contribution of the travel time to cost and saving parameter was rather insignificant, i.e. there was no significant variation in IRR, NPV and B/C ratio due to its exclusion. This explains the fact that the travel time savings is not a governing factor.
2. The total savings in the cost worked out to be the highest in the case of trucks, which is quite understandable, as trucks constitute a major part of the traffic.
3. It was determined that the proposed mode wise toll revenues versus the total revenue would be the maximum in the case of the trucks.

4. The sensitivity analysis determined that there is some variation in IRR due to the variation in benefits or due to the increase in the costs. This variation amounted to 15% to 20% in most of the cases. This explained the need for faster completion of the facility to obviate the problem of the escalating costs.
5. The optimum toll charges were found out to be as follows:  
Car: Rs.5, Bus: Rs 6; Truck: Rs 8; Two-wheeler: Rs 3.
6. An examination of the NPV value for various cases suggested that the increase in toll charges contributed to the decrease in NPV.

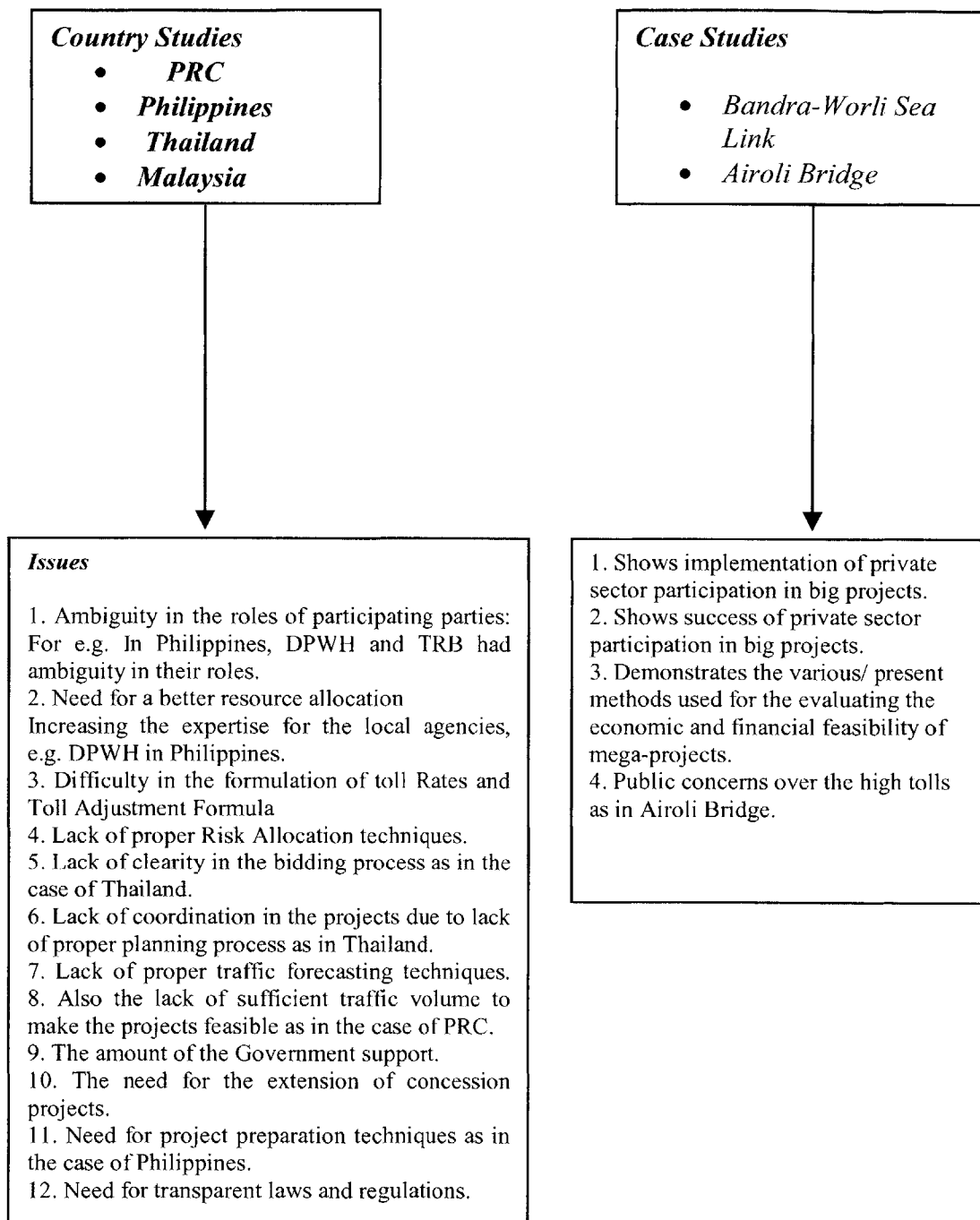
The study concluded the private sector participation is feasible for the Airoli bridge project.

#### **4.7 Summary of the present Chapter**

The important points of the chapter are summarized in figure 4.4.



**Figure 4.4 Summary of the present chapter**



**Chapter 5**

***Modeling of Various Issues Involved in Private Sector  
Participation***

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The current chapter presents a spreadsheet model in order to illustrate the various issues involved in public-private partnerships. The model helps in identifying the critical parameters that constitute the success of public private partnerships. Once these parameters have been identified, it is possible to recommend the future reforms and the development required in this area.

**5.1 Definitions and terms involved in the Model**

The parameters involved in the model are divided in to financial parameters and economic parameters.

**Financial Parameters**

1. *Concession period*: the concession period is defined as the period over which a private entity takes over the management of a state-owned enterprise.
2. *Construction Period*: the construction period can be increased by design changes, weather conditions and also unavailability of the resources at the proper time (labor, material).
3. *Construction cost*: construction cost of the project depends upon various factors which includes:
  - a). Physical characteristics of the project: the facility might be a bridge, a tunnel, a short congestion reliever road, an intercity artery or a development road. Different types of roads have different associated costs.

b). Geography of the area.

4. Operating cost: These can be divided into fixed and variable operating costs.
5. *Maintenance cost*
6. *Tolls*: The level of the tolls is an important factor in determining the success of the project. Usually tolls are the only factor producing a revenue stream for the private sector. High tolls may increase the financial benefits but may decrease the economic benefits and thus a trade off is required while deciding upon the level of tolls.
7. *Traffic forecasting*: The market demand for the facility attracts the finance for the facility. Also the traffic varies with the change in the toll rates and thus it is very important to consider the demand elasticity of the demand with respect to the price.
8. *Depreciation*: Each facility will lose its value due to depreciation. This loss in value depends on many factors such as age, type of the facility, maintenance etc.
9. *Inflation rate*
10. *Subsidy*: If the project revenues from the tolls are insufficient to cover the operating costs and the financing of the debt, the government may provide subsidy.
10. *Debt provided by the commercial institutional or other investors*: The debt can be taken as a lump sum from the institution or may be taken in different installments. The loan parameters may vary depending upon the type of the source. The parameters include the payback period, interest rate and the amount to be paid. Depending upon the loan conditions, the concessionaire may be given the option of paying the

principal plus interest or just the interest; the developer may also be able to defer interest or principal payments.

*11. Taxes:* These are to be paid by the private investor to the government on a yearly basis.

### **Economic Parameters**

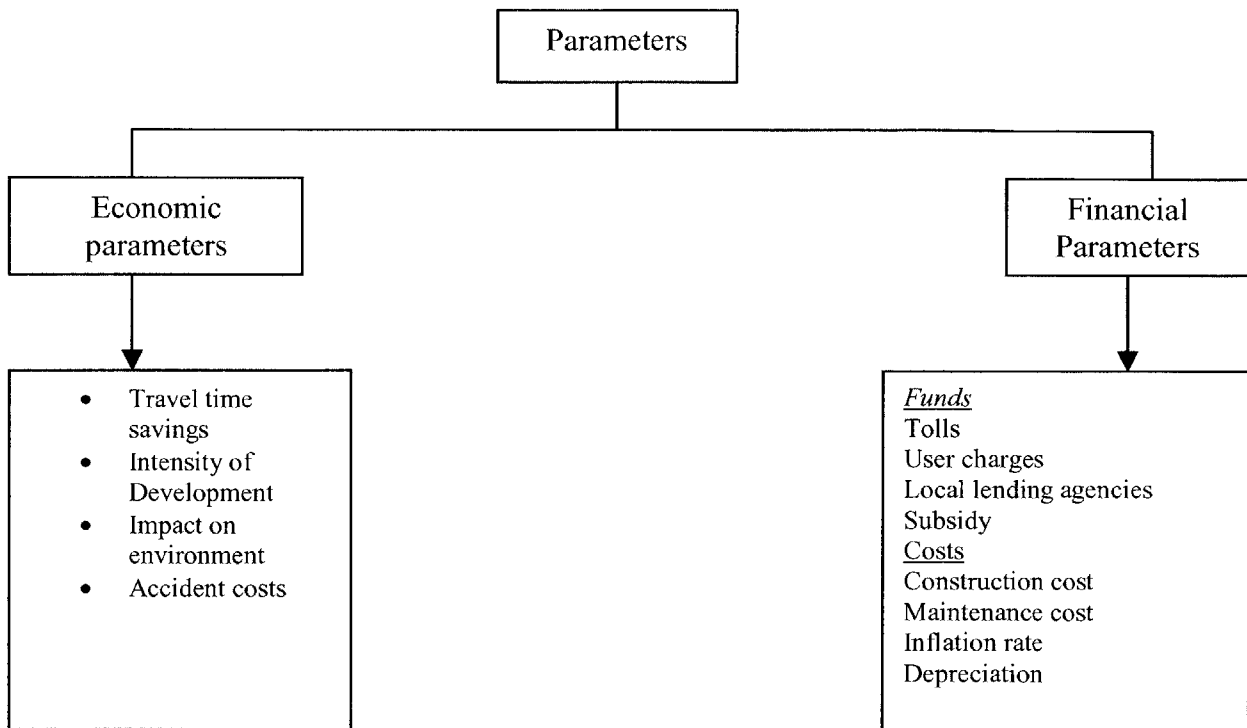
*1. Travel Time Savings:* The construction of the new facility may provide accessibility between two regions or reduce the time as compared to the already existing facility.

*2. Intensity of development:* The intensity of development will be affected due to the new facility. This affects the property value of the region to increase. This increase should not be attributed exclusively to increased accessibility and traffic capacity because it can also be a result of rezoning, density increases or other development proposals that are granted, along with the proposed network. This can be calculated by evaluating the property value before and after the proposal.

*3. Impact on environment:* Due to the construction of the facility, the pollution of the area increases and the environment is affected.

*4. Accident Costs:* The study of the accidents has not been done on a large basis so far in India. The exact relationship between the accident rate and the road user geometry is not established so far.

**Figure 5.1 Identification of the parameters for the Model**



## 5.2 Assumptions involved in the Model

The model is designed for estimating the financial and the economic feasibility of toll road projects. The model can be applied to any toll road project by changing the value of the parameters involved. The model is illustrated using parameters from the Vadodara-Halal Bypass and Jaipur-Kishangarh highway project. These are two large scale projects where the private sector participation has been introduced.

*1. Concession Period:* The concession period of the project is taken to be 15 years. In fact the model can be changed for different range of concession periods.

*2. Length of the Highway:* The length of the highway is taken to be 30 Km.

3. *Construction cost:* The construction cost of the highway is taken to be 1,300,000,000 Rs (\$26,000,000). This number is chosen because Vadodara-Halal Bypass is about the same length with a similar cost (*World Bank and Public-Private Infrastructure Advisory Facility, 2000*)

4. *Operating cost:* The operating cost is taken as 5% of the construction cost annually (*Consulting Engineering Services*).

5. *Maintenance cost:* The annual maintenance cost is taken as 4% of the total construction cost of the facility (*Consulting Engineering Services*).

6. *Toll rate:* The toll rate for the car is taken as to be Rs 20 (1.3 cents per Km); Toll rates for the buses/trucks are taken to be as Rs 63 (4.3 cents per Km). The toll rate is taken to be same as the Jaipur-Kishangarh Highway (*World Bank Staff, 2000*).

7. *Traffic Growth Rate:* The traffic for the year 2005 is taken as to be:

Cars: 5,000 per day

Trucks: 10,000 per day

Buses: 1,000 per day

The growth rate for the traffic is taken as to be:

**Table 5.1 Traffic Growth Rate**

	For Cars	For Trucks/Buses
2006-2010	1.1	1.1
2010-2015	1.2	1.2
2015-	1.3	1.3

The traffic growth can be varied in the model according to specific situations.

8. *Traffic Elasticity with respect to the tolls:* According to *Anna Matas (2000)*, the demand elasticity can be varies between -0.03 and -0.31. The traffic elasticity can also be changed in the model according to different situations.

9. *Financial Structure:* In the present model, the money has been taken in two phases:

70% of the money @ 6% interest rate and have to be returned within 10 years.

30% of the money @ 8% interest rate and have to be returned within 15 years.

10. *Depreciation rate:* The depreciation rate for the present model has been taken to be 0.6%.

11. *Inflation rate:* The inflation rate has been taken to be 1.5%

12. *Taxes:* The taxes have been taken to be 30%.

13. *Travel Time Savings:* The value of the time per vehicle is given by the following table:

**Table 5.2 Values of Travel Time Savings**

Mode	Value of time (per capita, Rs/hr)	Occupancy	Value of time per vehicle
Car	20	2.0	40.0
Truck	20	1.7	34.0
Bus	5	40	200.0

The base case for the model has been shown to be in Chart 5.1. The chart lays out all the parameters involved in the model their values. It also presents the financial and the economic structure of the project. These values can be changes for different projects in order to evaluate the economic and financial feasibility.

Chart 5.2 gives the calculation for the operating revenues of the project. The toll rate can be varied and according the change in the revenues can be seen. The chart also considers the change in the traffic demand with respect to the change in the toll rates.

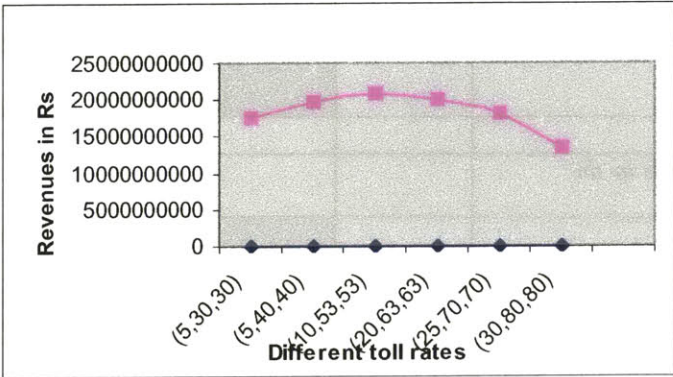
Chart 5.3 calculates the financial feasibility for the concessionaire. It takes into account all the costs and the revenues involved in the project and give the calculation of the NPV of the profits generated.

Chart 5.4 calculates the travel time savings because of the construction of the new facility.

**5.3 Sensitivity Analysis**

*Change of Operating Revenues with respect to change in tolls:* Figure 5.2 indicates the change of the operating revenues with respect to the tolls. The tolls can be increased up to a certain limit in order to increase the revenues. After that, the total toll revenue becomes less due to the elasticity of the traffic with respect to the price.

**Figure 5.2 Change of operating revenues with respect to the tolls**



*Change of NPV of the profits with respect to change in tolls:* Figure 5.3 illustrates the change of the NPV of the profits with respect to the change in the tolls.



### Chart 5.1 Base Case

**Concession period for the project: 15 yrs**  
**Year of start of construction of project: 2003**  
**Year of finish of construction of project: 2005**

<b>Construction and Operation</b>				
Length of highway =		30	Km	
Construction cost=		1,300,000,000	Rs	\$26,000,000
<b>Operating cost=</b>		65,000,000		(as 5% of the construction cost)
<b>Maintenance cost=</b>		52,000,000		(as 4% of the construction cost)
<b>Tolls and Traffic</b>				
Tolls for cars=		20	Rs	(1.3 cents per Km)
Tolls for buses/trucks=		63	Rs	(4.3 cents per Km)
<b>Traffic growth rate</b>				
<i>Traffic in 2005</i>				
Cars=		5,000	per day	
Trucks=		10,000	per day	
Buses=		1,000	per day	
Total number of vehicles=		16,000		
<b>Traffic increase</b>				
From		for cars	for trucks/buses	
2006-2010		1.1	1.1	
2010-2015		1.2	1.2	
2015-		1.3	1.3	
<b>Traffic elasticity with respect to the tolls</b>			(-.03 to -.31)	(Anna Matas, 2000)
		3	%	(With increase of one rupee)
<b>Financial structure</b>				
<i>Money taken in two phases by the commercial institute</i>				
70% @	Interest rate	6	(have to pay within 10 yrs)	
30% @	Interest rate	8	(have to pay within 15 yrs)	
First sum:		910,000,000	<b>Interest</b>	719,671,404
Second sum:		390,000,000	<b>Interest</b>	451,980,749
Subsidy: Provided by the public agency if the revenues do not cover operation cost and debt service requirements				

<b>Depreciation rate</b>			
From			
2005-2010	0.6		
2010-2015	0.6		
from 2015	0.6		
<b>Inflation rate=</b>	0.015		
<b>Corporate taxes=</b>	0.30		
<b>Economic structure</b>			
<b>Travel time saving from the construction of the proposed facility=</b>		20	Minutes
<b>Value of time per vehicle</b>			
Car		40	Rs
Truck		34	Rs
Bus		200	Rs

**Chart 5.2 Calculation of Operating Revenues**

Operating revenues							
No of	Per day	Per year	Toll				
Cars	5000	1825000	20	Rs			
Trucks	10000	3650000	63	Rs			
Buses	1000	365000	63	Rs			
					2003	2004	2005
							2006
From							
Cars					0	0	36,500,000
Trucks					0	0	229,950,000
Buses					0	0	22,995,000
Total revenues					0	0	289,445,000
							318,389,500

**As illustrated, the calculations are done up to year 2020.**

**Total Revenues for 20 years: Rs 20,032,258,436**

**Chart 5.3 Profit and Loss Statement**

No of	per day	Per year	Toll			Inflation rate	1.5
Cars	5000	1825000	20	Rs			
Trucks	10000	3650000	63	Rs			
Buses	1000	365000	63	Rs			
					<b>2003</b>	<b>2004</b>	<b>2005</b>
							<b>2006</b>
<i>From</i>							
<i>Cars</i>					-	-	36,500,000
<i>Trucks</i>					-	-	229,950,000
<i>Buses</i>					-	-	22,995,000
<b>Total revenues</b>					-	-	289,445,000
<b>Revenue stream</b>							
<b>Subsidy</b>					-	-	-
<b>operating revenues</b>					-	-	289,445,000
<b>Equity</b>					-	-	-
<b>Cost</b>							
Operating cost					-	-	65,000,000
Maintenance cost					-	-	52,000,000
<b>Depreciation</b>					-	-	7,800,000
Interest paid on 70%					-	-	71967140.39
Interest paid on 30%					-	-	30132049.93
<b>Profit before taxes</b>					-	-	62,545,810
<b>Cumulative profit</b>					-	-	62,545,810
<b>Profit after taxes</b>					-	-	62,545,810
<b>NPV of profits</b>							60,710,825
<b>Cumulative profit after taxes</b>					-	-	62,545,810
							152,281,119

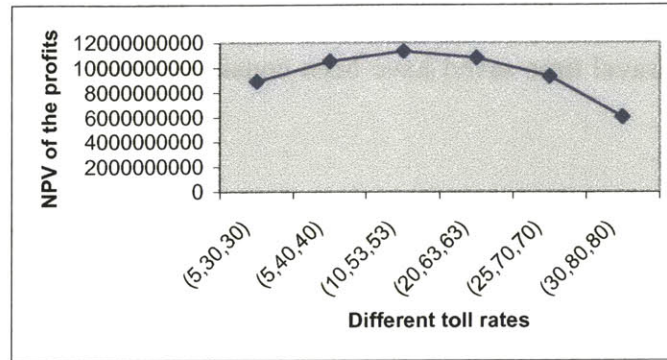
**Total NPV for 20 years= Rs 10,763,160,722**

**Chart 5.4 Travel Time Savings**

<b>Length of the highway=</b>			<b>30Kms</b>		
<b>Savings in the travel time =</b>			<b>45mins</b>		
<b>Value of time</b>					
			Saving	Toll	Net
Cars@	40	Rs/hour	30	5	25
Trucks@	34	Rs/hour	25.5	30	-4.5
Buses@	200	Rs/hour	150	30	120
<b>No of</b>	Per day	Per year			
Cars	7250	2646250			
Trucks	19900	7263500			
Buses	1990	726350			
<b>Savings due to travel time</b>					
		<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>
<b>Cars</b>		-	-	66,156,250	72,771,875
<b>Trucks</b>		-	-	(32,685,750)	(35,954,325)
<b>buses</b>		-	-	87,162,000	95,878,200
Savings per year		-	-	120,632,500	132,695,750

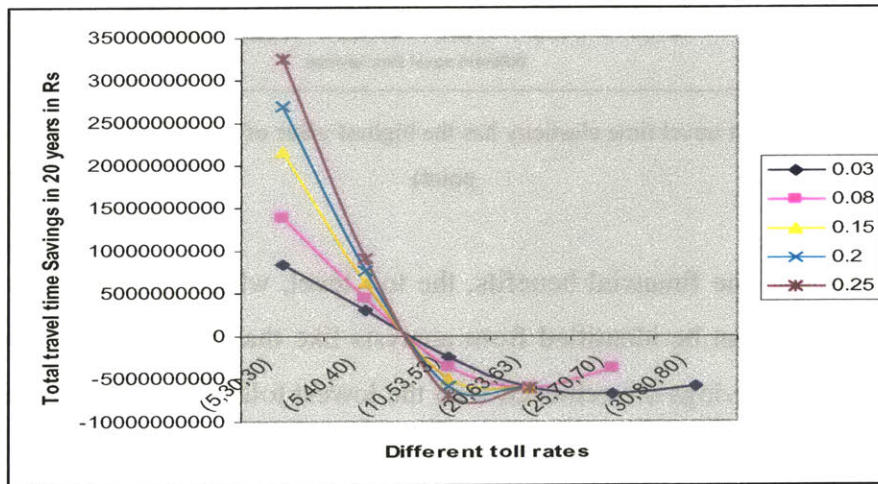
**Total travel time savings in 20 years: Rs 7,633,982,975**

**Figure 5.3 Change of NPV of the profits with respect to the tolls**



*Change of Total Time Savings due to the change in the toll rates:* The total time savings decreases with the increase in the toll rates and is illustrated by Figure 5.4. Also, the variation of the travel time savings is illustrated with respect to the change in the demand elasticity with respect to the tolls, which varies from .03 to 0.25

**Figure 5.4 Change in the travel Time Savings due to the change in the tolls  
(Travel time saved = 45 minutes)**



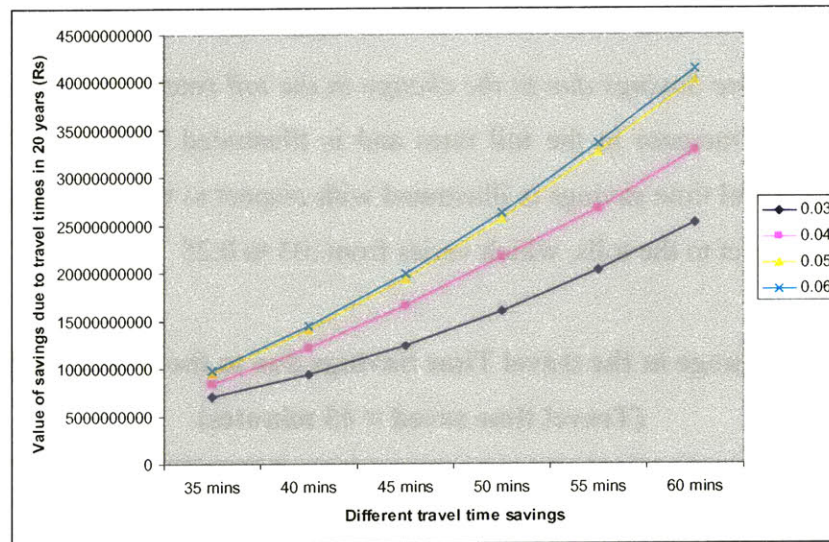
(The line with the highest toll elasticity has the highest profits at the starting point)

The traffic also changes with the change in the time saved because of the availability of the facility. The more the time saved, the more the traffic attracted. Thus the benefits due to the travel time savings increases with more time saved by the construction of the facility, in figure 5.5, the variation of the benefits due to the travel time savings is seen

with respect to the time saved (it depends on the length of the toll road). The toll elasticity is kept constant while studying this variation. Different elasticities for demand with respect to the travel time saved have been considered and is indicated in the below figure.

**Figure 5.5 Change in the travel Time Savings due to the change travel time saved (or length of the highway)**

**(Tolls: Cars=10 Rs, Buses/ Trucks= 53 Rs)**



(The line with the highest travel time elasticity has the highest value of travel time savings at the starting point)

In order to increase the financial benefits, the toll level, which generates the maximum amount of revenue, can be identified from analysis like that in figure 5.3. However, the greatest travel time savings are achieved with the lowest tolls. Thus, there exists a tradeoff between the financial benefits and the economic benefits. This is a major issue with regard to toll financing of the highways. The private sector is much more concerned about increasing the financial benefits where the public sector is interested in the financial benefits as well as the economic benefits.

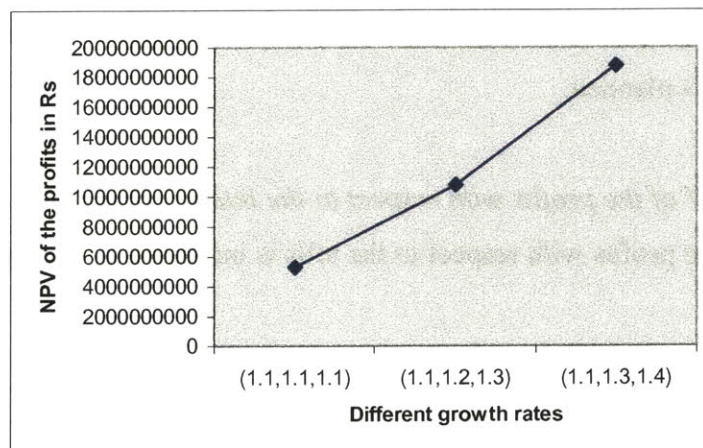
The toll rates can also be set uniform across the network or may be varied from road to road. This is again an important issue since the uniform toll rate for the network helps in

increasing the financial benefits for the entire network whereas different toll rates for different roads tend to increase the benefits for a particular road. In India, most of the roads use their own toll rates (*World Bank and Public-Private Infrastructure Advisory Facility, 2000*). Also the toll rates can be varied with respect to the vehicles. According to *Asian Development Bank (2000)*, different toll rates for different rates for different vehicles increase a sense of fairness and are much more politically acceptable. In India, the toll rates are varied according to the vehicles and the same approach has been used in the present model.

*Public Acceptance:* The construction of the facility requires relocation and resettlement. It is important for the private investors that the land acquisition risks are borne by the government. Also the construction of the facility has an impact on the environment in terms of noise and the air pollution. For e.g. In India, the construction of the Bandra-Worli Sea-Link in Mumbai faced serious opposition from the local residents and the fisherman. The project planning process be designed in a way to consider these problems.

*Traffic Forecasting:* This is a very important component in making the project financially feasible. The low traffic volumes would not generate enough revenues to get back the investments and pay the debts. The profit varies greatly with the traffic growth rates and is indicated by the following figure

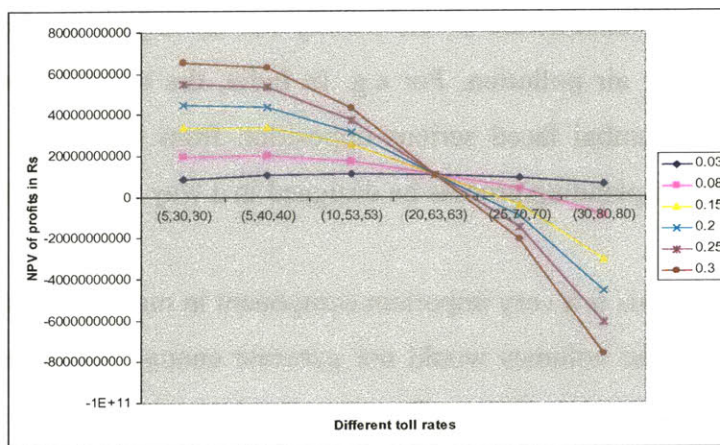
**Figure 5.6 Change of profits with the traffic growth rate**





It is clear from the figure that the profits vary to a great amount due to change in the traffic growth rate and hence a very precise traffic forecasting method is required. The over estimation of the traffic should be avoided. The contractors get most of the profits by construction of the facility and hence may have a very optimistic traffic forecasting. These may lead to the conflicts between the construction company and the operating company. Also it is important to carry out the sensitivity analysis with respect to the traffic and the variation of the traffic with respect to the price. The following figure illustrates the importance of the demand elasticity of the traffic with respect to the price.

**Figure 5.7 Change of the Profits for different Demand Elasticities**

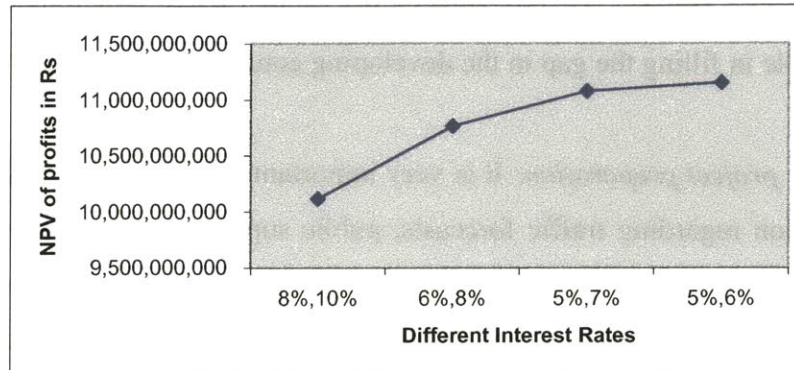


(The line with the highest toll elasticity has the highest profits at the starting point)

From the figure 5.6, it is clear that the variation of the traffic with respect to the price has a great impact on the profits. It is therefore important to conduct the sensitivity analysis before the project is planned.

*Change of the NPV of the profits with respect to the interest rates:* The change of the net present value of the profits with respect to the tolls is indicated by the following figure.

**Figure 5.8 Change of the profits with respect to the interest rates**



In order for the project to have more financial benefits, it is important that the interest rate on the loans should be kept as low as possible. The interest rates can be kept low by borrowing the money from the domestic market rather than the international market. Also the debt from the capital market helps in avoiding the exchange rate risks. In spite of these benefits, the domestic markets in developing countries are not very well developed and are unable to provide the long term capital costs. The projects then must have a good project structure and enough traffic volume in order to attract the foreign commercial loan banks.

*Asian Development Bank (2002)* suggests other sources of the funding, which include:

**Subordinated Loans-** These are much more acceptable to the debt providers because of the government support and sponsors support. According to the *Asian Development Bank (2002)*, these must be applied carefully because it may impair the sponsors' commitment to the project.

**Senior Commercial Loans:** According to the *Asian Development Bank (2002)*, the longest tenure for a long-term loan for a toll road project in East Asian countries is about five years. This period is too short to get the investments back. This period is about 15-30 years in the developed nations.

Institutional Investors: These may be a very good source for funding. According to the *Asian Development bank (2002)*, these investors are more active in the developed nations than the developing nations. For this purpose the foreign institutional investors can play an important role in filling the gap in the developing countries.

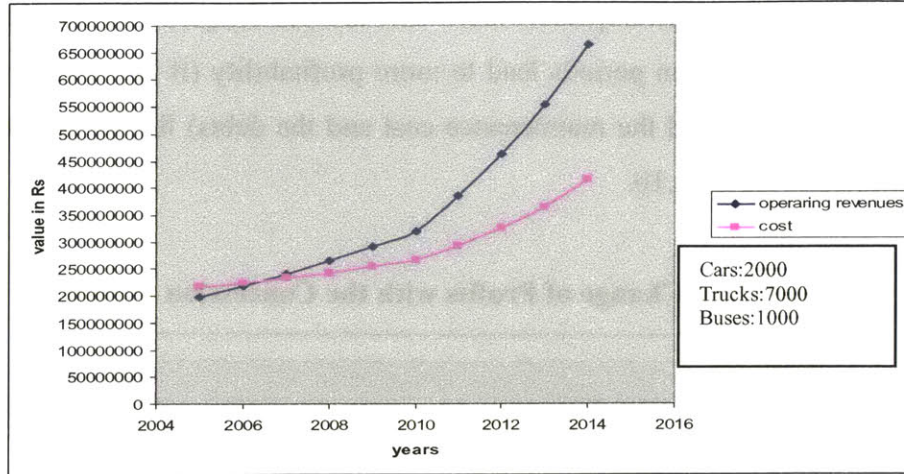
*Lack of proper project preparation:* It is very important for the public sector to have the basic information regarding traffic forecasts, public support, engineering studies before inviting the private sector. In the current model, if the traffic forecasts are very optimistic than the real forecast, the project is not financially feasible. This is indicated in Box 5.1.

**Box 5.1 Financially feasibility of the project (with respect to the traffic volume)**

For the present model, the construction cost of the project is Rs. 1300,000,000 (\$ 26,000,000). In order for the project to be financially viable, the participating company should be able to get back the investments and make some profits. For a toll rate of: Cars = 20 Rs; Buses; Trucks= 63 Rs; the minimum traffic which is required is 1000 cars, 4000 trucks and 200 buses. This traffic volume would help to recoup the construction cost in the concession period (20 years). If the traffic volume is less than this amount, then the construction cost is not recouped leaving apart the interest rate, In that case, the public sector has to provide subsidies in order to make the project financially viable.

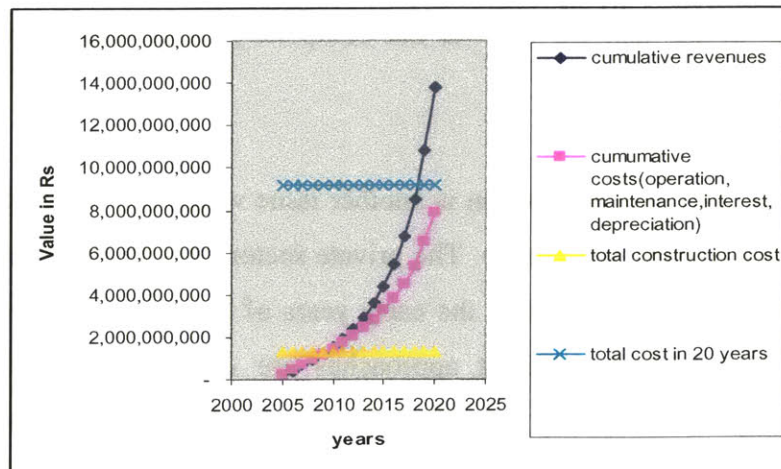
In addition to proper project preparation, it is important to have strong public sector institutions. The public sector support is required to run the efficient planning and operation of the project. For e.g. In the present model, if the traffic volume is not sufficient to generate enough revenues, a strong public sector can help by providing subsidies.

**Figure 5.9 Difference between the revenues and the cost**



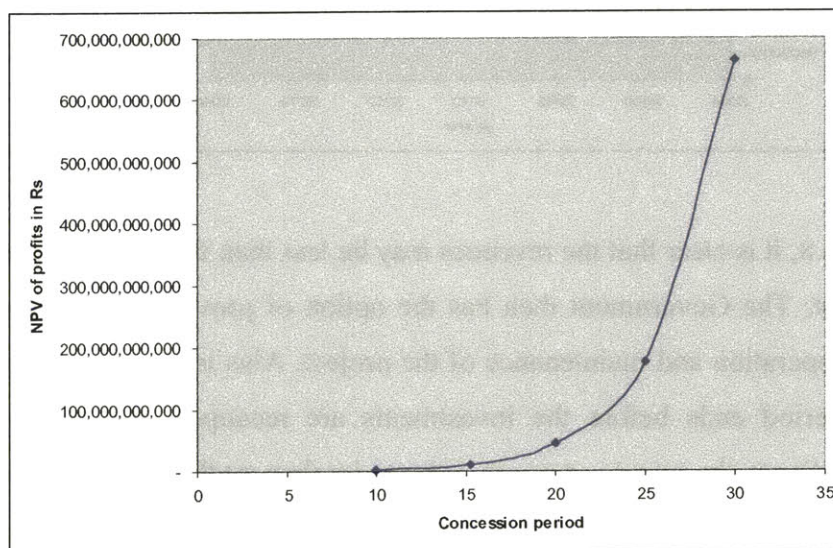
From figure 5.8, it is clear that the revenues may be less than the costs for the initial years for the project. The Government then has the option of providing subsidies in order to continue the operation and maintenance of the project. Also in certain projects where the concession period ends before the investments are recouped, the public sector may provide subsidies to the private sector in order to implement the project. In figure 5.9, the various cost and the revenues involved are presented. The numbers of cars are taken as 1000 and the number of buses and trucks are taken to be 7000 and 1000 respectively. The figure illustrates that if the cumulative revenue in the concession period is less than the total cost, subsidies are required in order to implement the project.

**Figure 5.10 Various cost and revenues involved in the project**



*Concession Period:* This is an important factor that decides the profit for the participating company. Longer concession periods lead to more profitability (if the revenues are able to pay for the operation and the maintenance cost and the debts) for the operating party and are indicated in figure 5.10.

**Figure 5.11 Change of Profits with the Concession Period**



The longer concession may generate more profits but the immediate profitability of the project is not improved. Also the governments have to be careful when the asset valuation of the project has to be made at the end of the concession period. In certain cases payments are made to the concessionaire with the transfer of the project. The government has to see that the asset is not completely depreciated at the end of the concession period.

*Land Acquisition:* The land acquisition is another issue which has to be dealt with while designing a public-private partnership. The private sector likes to avoid large acquisition cost because the revenues are less in the early years of the project. According to *Asian Development Bank (2000)*, different approaches are used with respect to the land acquisition. The government may own the land and transfer it to the private sector at no cost during the concession period. The private sector then returns the land to the

government at the end of the concession period. In another approach, the private sector owns the land and transfers it to the public sector at no cost. When the public sector owns the land, the private sector has the inclination of the increasing their revenues from the toll road rather than the development of the land. When the private sector owns the land, the inclination is to maximize the profits from the area rather than just the toll road. This leads to the development of the whole area.

## **5.4 Toll financing**

### *5.4.1 Advantages of toll financing*

- Toll facilities often benefit only certain areas or groups of users and not the community as whole. Tolls provide a method whereby these particular groups can be made to pay. In some cases, the users largely responsible for the congestion are “out of state’ visitors who contribute very little by way of fuel or taxes.
- Toll roads often provide superior service to the public e.g. greater safety and comfort, travel information, etc., for which users are prepared to pay.
- Toll financing makes possible the early construction of high-cost, high priority facilities and thus overcome the legal and financial obstacles that would result in piecemeal construction and lengthy delays. As a result, such facilities permit the early realization of time savings and lower vehicle operating costs.
- Toll financing has made possible in some cases limited access to roads when legislatures for a variety of legal or other reasons may have been reluctant to limit access for free highways. Limited access can provide greater safety and economic benefits.

- Successful toll roads make possible “pooled financing” and thus allow other facilities needed in the area to be provided and for which bonds could not be sold if the only security was the revenue from these other facilities.
- Once built they induce improvements on connecting roads and as a catalyst in making funds available for these general improvements.
- It is “last resort” financing, i.e. rather than be without the facility if the tax revenues are insufficient or unavailable users are prepared to pay the tolls, and if bondholders are willing to risk their funds they should be allowed to do so for any other investment.

#### 5.4.2 Disadvantages or Objections of toll financing

The objections to the toll road projects can be summarized as:

- Construction costs for toll facilities are higher than for free facilities. Construction of tollbooths and special interchange designs required for toll collection can increase the construction costs by 15%.
- Toll roads may involve double taxation and restrict use. Since users are already paying for roads via gasoline and other taxes, marginal users are deterred from using the road when its capacity is not being fully utilized, and, as a result, economic welfare is not being maximized.
- Toll roads cannot accommodate satisfactorily very short-distance traffic, which is a general characteristic of vehicle use, therefore, alternative free roads must be maintained and investments are duplicated. Construction to expressway standards almost invariably involves extensive relocation and the need to return the old road to provide access to already developed land, houses and businesses.

- The toll road method is unsatisfactory in conditions where the needs for large road expenditures are greatest and congestion the most severe-urban areas- because of the large number of access points required, the short average trips and peak-hour loads. These factors would increase collection costs drastically and delay traffic even more if satisfactory access and distributor roads were not also provided.
- Points of access may be too few. The wide spacing between these points inhibits the growth of economic activity, which often takes place at interchanges.
- Toll roads may interfere with a rationally planned overall highway system. It may perpetuate the use of obsolete tax revenue allocation formulae; it results in expensive separate facilities since segments of existing routes or right-of-way cannot be used; it may involve prohibition or serious limitations on road improvements in the neighborhood of the toll road to protect the bond holders interests- these limitations may be inserted in agreements at the initiative of the investment bankers.

### **5.5 Summary of the Chapter**

The chapter presents a model, which helps in illustrating the important parameters, and issues involved in public private partnerships in toll road projects. The Sensitivity of the profits has been performed with respect to:

- Change in Tolls
- Change in interest rates
- Change in demand elasticity with respect to price.
- Change in the concession period

The sensitivity analysis helps in identifying the important issues in toll road projects, which are:



1. Toll Rate
2. Traffic Forecasting
3. Public Acceptance
4. Financing structure
5. Length of the concession period
6. Land Acquisition

All these have been summarized in the next chapter and various recommendations are presented in order for India to improve its private sector participation and performance.

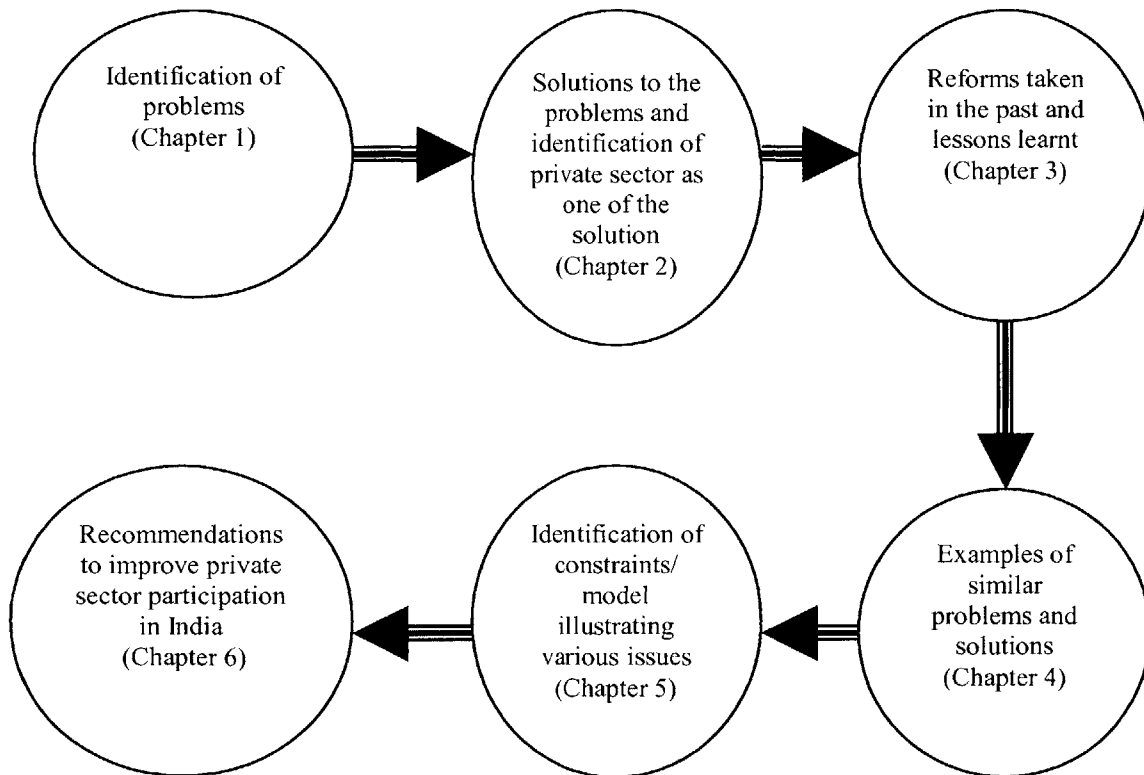
**Conclusions and Recommendations**

The present chapter gives a brief summary of the ideas presented in the thesis. The chapter also makes important conclusions to the thesis based on the study done. The current situation of the transport sector in India is illustrated and the level of private sector participation is analyzed. Further, the chapter makes various recommendations to improve the environment for private sector participation in transport sector in India.

**6.1 Summary**

The approach to the thesis is summarized in the following figure:

**Figure 6.1 Approach to the thesis**



From chapter one it is clear that there has been a mismatch between the supply and demand for transport service and infrastructure. As identified by the World Bank, the transport sector in India suffers from- 1). Unclear and conflicting responsibilities 2). Inadequate resource mobilization 3). Poor Asset/ System Management 4). Inadequate Imposition of Accountability. These problems have led India to look for better ways to manage the transport sector and private participation is one of the solutions as identified in chapter two. From chapter two, it becomes clear that private sector participation, if implemented successfully, is capable of solving the problems identified. Chapter three presents the outcome of the poor transport sector in India. The chapter also gives an overview of the reforms taken in the past to improve the transport sector and the lessons learnt from these reforms. Various reforms have been taken which have created good environment for private sector participation. In 1989, an “open skies” policy was adopted which allowed the foreign cargo airlines to enter and thus opened the doors for high-value exports. Market liberalization started to take place in 1991. The National Highway was amended in 1995 to allow greater participation of private sector. The World bank and the Rakesh Mohan committee report also suggest the greater participation of private sector in Indian Transport sector.

Chapter four illustrates two examples where private sector participation has been successful in India: the Bandra-Worli Sea Link and Airoli Bridge. The success of these projects creates an environment for the growth of the private sector participation. The chapter also presents four country studies (PRC, Philippines, Thailand and Malaysia), which gives an idea of the benefits and the constraints faced by the private sector participation in developing countries.

Chapter five presents a model that helps in evaluating the financial and the economic feasibility of private sector participation and helps in identifying and illustrating various constraints involved in private sector participation. The present chapter concludes the thesis and makes various recommendations in order to improve the environment for private sector participation in India.

## 6.2 Conclusions and Recommendations

Although a number of steps have been taken to attract private sector participation, various constraints exist in its implementation. These constraints are divided into indirect and direct constraints.

*Indirect Constraints:* These types of the constraints can be classified as the common constraints of the developing countries and includes the following:

- Low economic growth.
- Higher Poverty rate as compared to the developed countries.
- High population growth rate for countries like India and China.

These constraints affect all sectors of the country and the transport sector as well. In fact the transport sector also affects the above problems and better transport system can lead to higher economic growth and low poverty rate.

*Direct constraints:* These are the constraints which have been identified from chapter two and chapter four of the present thesis. These can be divided into various classes as follows:

*Planning and Institutional Issues:* These include:

- Absence of a good planning framework
- Absence of clear sector policy environment
- Absence of clear and mature regulatory framework- the concession laws are not well defined and currently the basic legislative and regulatory cannot be provided to the private sector.
- The amount of the Government support is ambiguous and in cases leads to greater risk for the private sector.
- Absence of competition in the contract awards.
- Lack of identification of public support in using the non-user benefits.

### *Methodological or the procedural Issues*

- Absence of clear bidding and the selection procedures
- Absence of proper risk analysis
- The current procedures do not consider all the relevant criteria and the variables affecting the projects.
- The current procedures are time-consuming requiring great amount of effort.
- Lack of transparency in the evaluation procedure.
- Lack of expertise in developing good evaluation procedures.
- Current traffic forecasting techniques are not precise and efficient.

### *Financial Constraints*

- High contracting and bidding costs
- Expensive financing terms
- Weak domestic capital markets
- Limited public resources

### *Social Constraints*

Public acceptance to the tolls- This is clear by the country study of China where there was a huge resistance to higher tolls. Also privatization leads to change in the form the businesses works and requires change for the people.

### *Political Constraints*

- Involvement of various public agencies, which leads to unclear and fragmented responsibilities.
- Focus on the administrative process rather than the strategic methods and the results.

The following table summarizes the present situation of Indian Transport sector with regard to the various constraints.

**Table 6.1 India with respect to various constraints in private sector participation**

<i>Constraints</i>	<i>Current Practices</i>
<i>Planning and Institutional</i>	<p>Great amount of support form the public sector e.g. covering senior debt in the event of a concessionaire failure.</p> <p>Policy on Airport Infrastructure, approved by the Cabinet in 1997, encouraged the government's focus on increasing private sector participation.</p> <p>Cochin airport which is partially privately financed has been commissioned as a build-own-operate basis</p>
<i>Methodological/Procedural</i>	<ul style="list-style-type: none"> <li>• There have been delays in getting the clearances. Some laws such as 1997 ordinance and 1997 Environmental Protection act clarified some of the procedures.</li> <li>• Tolls and traffic levels used in the bid are pre specified and awards are based on the concession period.</li> </ul>
<i>Financial</i>	<p>Risk allocation techniques have been used and have been efficient in projects like the jaipur-kishangarh highway described in section 5.2.1</p> <p>Small bridges and bypasses have been attracting private financing</p>
<i>Social</i>	<p>Public resistance to the toll roads e.g. Airoli bridge</p>
<i>Political</i>	<p>Both the central and the state governments are interested in promoting private sector participation for the highways.</p> <p>The government has introduced some liberalization measures but also maintained restrictions on the participation of foreign airlines in domestic markets.</p>

Various steps can be taken in order to alleviate the above constraints and create a good environment for the growth of private participation India.

At the planning and the institutional level, India needs to plan to develop a strategic planning network. This is important to optimize the project in terms of economic and financial benefits. Methods such as cross subsidies can be used for the network expansion. The responsibilities of the central and state governments and the various agencies involved in public private partnership needs to be clearly defined. The different agencies involved should set performance targets. The risks involved in the project should be clearly defined and proper steps be taken for the share of the risks between the public and the private sector. In order to reduce the risk for the private sector, the concession period can be made flexible as implemented in some projects such as the Noida Bridge and Vadodara Halol Bypass. The variable concession period reduces the demand risk for the private sector. Private sector may not be able to handle long term and large scale investments and may need strong government support for the implementation of the project. India may also plan to form a government regulatory body to coordinate various project proposals. Proper project preparation techniques need to be used. This includes design of bidding process to attract foreign investors, better planning of the project for economic and financial feasibility, collection of detailed engineering data and proper use of information management.

At the legal and the regulatory level, there is a need for transparent and well-drafted laws and regulations. The concession laws needs to be defined in terms grants of the concession and extension of the concession period. Also proper laws be defined in case the concession is terminated. In order to attract the private sector at a large scale, there is a requirement of a clear risk sharing and detailed regulations in each project. Transparent procedures for bidding are required and it should decrease the residual risk for the government. Clear bidding and tender process would be able to attract foreign investors in the future projects. Land Acquisition laws should also be clearly defined.

Government support- The amount of the Government support has to be clearly defined for the toll road projects in India. The major risk for the toll road project is that of the traffic and it cannot be completely controlled by the private concessionaire. The public sector can provide a minimum traffic or revenue guarantee in which the government can provide cash or soft loans to the private sector. The government can also introduce methods such as the “shadow tolls”<sup>1</sup> to support the private sector.

Traffic forecasting- Many of the toll road projects around the world have suffered from the problem of less-than-Forecast-Traffic. In order to solve the problem, India may introduce independent audits of traffic forecasts. Proper sensitivity analysis should be conducted with respect to the traffic and traffic diversion.

Public Acceptance- There has been instances in India where the project has faced the problem of public acceptance. The Bandra Worli Sea link faced severe opposition from the local residents because of the issue of land acquisition. The Airoli Bridge faced resistance due to the high tolls. In order to solve these issues, several steps can be taken. Mitigation of the adverse environmental impacts due to the toll roads should be an integral part of the planning process. India should strive to promote effective public relations. This would help in fostering public acceptance to the toll projects.

All these reforms and changes can lead India to attract private participation at a greater level and create good environment for private sector in transport sector in India.

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<sup>1</sup> In Shadow toll method, the private sector finances the construction and is entitled to operate and maintain the road for the concession period. The public sector then pays the “shadow” toll revenue based on the actual level of traffic. This toll is paid by the government and is not charged to motorists- Asian Development Bank, 2002.





## *Bibliography*

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The following important websites have been used for the present study private sector participation in transport sector India.

1. Asian Development Bank - <http://www.adb.org/>

(Asian Development Bank is a financial institute with its headquarters in Manila. The Bank is dedicated to reducing poverty in Asia and the Pacific. The Bank extends loans and equities to the developing countries in order to help the countries develop socially and economically. It also facilitates private and the public resources for development in these countries. The Bank is mobilizing knowledge on best practices in various areas and has been very active in India. In India, the bank looks for new ways to empower rural poor. It also strives to make finance reforms on order to make the markets better. It has been very active in the IT sector and private sector implementation India).

2. Airports Authority of India – <http://civilaviation.nic.in/aai/airport.htm>

(The authority came into existence in the year 1995 and is responsible for the infrastructure facilities provided at the various domestic and international airports in India).

3. City and Industrial Development Corporation of Maharashtra Limited- <http://www.cidcoindia.com>

(This is a premier town planning organization in India. The corporation is owned by the government of Maharashtra and is responsible for planning and development of new metro cities close to Mumbai. The corporation is very active in planning the Special Economic Zone- Navi Mumbai)

4. Indian railways official website – <http://www.indianrail.gov.in>

(This is the official website of Indian railways and provides various information about the sector. It presents the latest data. It also provides the train schedules and any updated information regarding the sector).

5. Maharashtra State Road Development Corporation - <http://www.msrdc.org/>

(The corporation was developed in 1996 to accelerate the develop of infrastructure in Mumbai. The organization is fully owned by the government of Maharashtra. The main aim of the corporation is to develop the existing facilities and to create new facilities in the state. The corporation works with in collaboration with the private sector).

6. The World Bank Group - <http://www.worldbank.org/>

(The group is comprised of five institutions: The International bank for Reconstruction and Development; The International Development Association; The International Finance Corporation; The Multilateral Investment Guarantee Agency; The International Centre for Settlement of Investment Dispute. 180 countries own the group. The Bank has the primary focus on the developing the poorest countries. It helps the developing and the under developed nations by providing financial assistance and technical expertise. In the year 2002, the group worked in more than 100 countries. The group has been very active in India and has been involved in various projects such as the Tamil Nadu State Highway Project, Allahabad Bypass project and the Rural Road project).

Abdulaziz, Y. 2001, “ Multi Criteria Decision Making Model for selection of BOT Toll Road Proposals within the public sector”, University of Pittsburgh, Dissertation for Doctor of Philosophy

Allen, W.H.& Rattigan, L.J., (1989)“Public/Private Initiative in the United States: The Dulles Toll Road Extension”, Transport Policy, Management and Technology towards 2001, The fifth World Conference on Transport Research, Vol I, Yokohama, pp 159-173

Anna Matas (2000), “Demand Elasticity on Tolled Motorways”, Department of Economics, University of Barcelona, Spain.

Antonio, Estache (1995), “Decentralizing Infrastructure-Advantages and Limitations”, Washington D.C., World Bank Discussion papers.

Asian Development Bank (2000), “ Developing Best Practices for Promoting Private Sector Investment in Infrastructure- Roads”.

URL: [http://www.adb.org/Documents/Books/Developing\\_Best\\_Practices/Roads/default.asp](http://www.adb.org/Documents/Books/Developing_Best_Practices/Roads/default.asp)

Bansal, A., Bhandari, A., Gupta, D.P., & Vickers, P. (2002), “ India’s Transport sector: The challenges Ahead”, The World Bank Group.

URL:<http://lnweb18.worldbank.org/sar/sa.nsf/6062ad876fb8c066852567d7005d648a/6fcfc02e809feb0c85256beb00440cde?OpenDocument>

Bhattacharya, S., Patel, U.R. (2000), “The Constraints in Pricing and Financing”, Infrastructure Development Finance Company, India.

Button , K.J. (1989), “ Private Provision of Roads in Europe”, Transport Policy, Management and Technology towards 2001, The Fifth World Conference on Transport Research, Vol I, Yokohama, pp 145-159

Choudhary,K. Dangayach,D.,Dwivedi, P., Sharma,T.,Madhav,V.(2001), “Road Sector in India”, Indian Institute of Management, Ahmedabad , India.

URL: <http://www.3inetwork.org/reports/IIMStudReport2001/B9.pdf>

Economic Survey of Delhi (2001-2002)

URL: <http://delhiplanning.nic.in/Economic%20Survey/Ecosur2001-02/PDF/chapter12.pdf>

Dennis,R. (2001) “ Partnership for Development- Private sector Cooperation in service Provision”, United Nations Online Network in Public Administration and Finance.

URL: <http://unpan1.un.org/intradoc/groups/public/documents/un/unpan006231.pdf>

Indian Railways Statistics (2001), Center for Monitoring Indian Economy.

URL: <http://www.cmie.com/>

Indian Railways Report (2001), Policy Imperatives for Reinvention and Growth, Vol II, part I.

Inland Waterways Authority of India (2001), *Proposal for Obtaining External Aid for Projects Related to Development of Inland Water Transport Infrastructure*.

Lakshmanan T. R. (1997), “Privatization in Transport”, Boston University.  
URL: <http://www.bu.edu/transportation/LakshDay2.ppt>

Menendez, A.(1998), “Constraints and Opportunities for PPP Transport Projects”, Lahmeyer International GmbH, World Bank Group.  
URL: <http://rru.worldbank.org/Toolkits/highways/documents/pdf/78.pdf>

Philip, G. (2001), “Private Participation in Infrastructure- A review of the evidence”, Private Provision of Public Services Group, Private Sector Advisory Services  
URL:<http://rru.worldbank.org/Strategy/documents/PPI%20A%20Review%20of%20the%20Evidence%20Version%203R%20a.doc>

PPI Initiative in China, Transport Sector (1999), draft report prepared for the World Bank  
URL: [http://inweb18.worldbank.org/SAR/sa.nsf/Attachments/tpt13/\\$File/Chapter3.pdf](http://inweb18.worldbank.org/SAR/sa.nsf/Attachments/tpt13/$File/Chapter3.pdf)

Rakesh Mohan Report on Infrastructure, (1996)  
URL: <http://www.irastimes.org/detailedresponsetoch5rmcreport.htm>  
(This is a landmark report published in 1996 in India for improving the Infrastructure sector in India. Various recommendations of this report have been adopted by the Indian government)

Ruster, J. (1997), “A Retrospective on the Mexican Toll Road Program (1989–94)”, World Bank Discussion Papers.

Santos, B., Galano, G.Z., “Toll roads in the Philippines: Current Status and Future Development”, Department of Public Works and Highways, Philippines.

Tiong, R.L.K. (1990), “Comparative Study of BOT projects,” ASCE, Journal of Management in Engineering, Vol6, No. 1, pg 107-122

Tiwari, G. (2001), “Transportation Safety Issues- Institutional Restructuring Proposed for India, Indian Institute of Technology, Delhi.

US Department of Transportation, Financing Federal Highways (1999)  
URL: [www.fra.dot.gov/policy/RailProjectPlanningandFinancingGuide\\_al.htm](http://www.fra.dot.gov/policy/RailProjectPlanningandFinancingGuide_al.htm)

Vajpayee,N., Shastri.V.(1999), “Port Development in Tamil Nadu- Lessons from Chinese Province”, Development Discussion Papers, Harvard Institute for International Development, Harvard University.  
URL: <http://www.hiid.harvard.edu/pub/pdfs/731.pdf>

Wanisubat, S. (2002), “Toll Road Policy In Thailand”, National Economic and Social Development Board, Thailand.  
URL: [http://www.worldbank.org/transport/toll\\_sem/vol2/c-doc/07thaila.rtf](http://www.worldbank.org/transport/toll_sem/vol2/c-doc/07thaila.rtf)

Wood, B. (2002), “ Infrastructure Development: Private Sector Solutions for the Poor- The Asian Perspective”, ADB/PPIAF Conference, Manila, Philippines.

World Bank (1995)-“ India Transport Sector- Long Term Issues”, Washington D.C.

World Bank (2000) – Private Participation in Infrastructure (PPI Database)

URL: <http://rru.worldbank.org/Viewpoint/HTMLNotes/250/250Izagu-101502.pdf>

World Bank and Public-Private Infrastructure Advisory Facility (2000) - Country Framework Report for Private Participation in Infrastructure.

URL:<http://lnweb18.worldbank.org/sar/sa.nsf/a22044d0c4877a3e852567de0052e0fa/aa35b25556c395fd8525693800662973?OpenDocument>

World Bank (2002), “ Indian Transport Sector : The challenges Ahead- Appendices”.

URL: [http://lnweb18.worldbank.org/SAR/sa.nsf/Attachments/tpt14/\\$File/Chapter4.pdf](http://lnweb18.worldbank.org/SAR/sa.nsf/Attachments/tpt14/$File/Chapter4.pdf)