Chapter one

India Infrastructure Scenario

Introduction:

Infrastructure[1] signifies roads, airports, sewages and water systems, railways, telecommunications and other public utilities. Also called *social overhead capital*, infrastructure is basic to economic development and improvement in it can be used to help attract industry to a disadvantaged area.

Infrastructure has developed over the years and has broader coverage with the advancement of civilization, technology and urbanization. However, such developments relate mainly to hard infrastructure. The historical evolution of infrastructure is discussed in the succeeding Para.

Before 1700, infrastructure mainly consisted of roads and canals for use as a means of transportation or for irrigation. The first paved streets were built around 4000 BC. In the medieval Islamic world, many roads were built throughout the Arab Empire. However,the first major road in India popularly known as The Grand Trunk Road was built by Sher Shah Suri in 1540-45, connecting Sonargaon near Dhaka in Bangladesh with Peshawar in modern-day Pakistan linking several cities from in India. During 1700-1870, as traffic increased toll roads were built by Turnpike Trust between 1730-1770, Inland canals preceded the development of railroads during the early phase of Industrial

[1] As defined in Bibliography sl no. a.1(page 2)

Revolution. Tarmac and concrete roads came up towards the end of the 19th century. Post 1920, roads were developed as limited access projects and have continued to be expanding both in size and quality. This research work is focused mainly on the issues involved with the tolling on the transportation sector particularly the tolling on highways.

1.1 Current Scenario of Transportation in India:

Unarguably the most exhaustive and authentic document that showcases the infrastructure scenario now and twenty years down the line is the **India Transport Report**-*Moving India to 2032*, authored and presented on 31 January 2014, by National Transport Development Policy Committee (NTDPC), headed by Dr. Rakesh Mohan.

Some of the key highlights[2] of the committee report are reproduced as under-

1.1.1 NTDPC's Approach

- Prior thinking on transport policy in India has been too project-centric.
- Coherent *system-based* strategy adopted in the Report cuts across modes of transport, administrative geographies, and integrates capital investment with regulatory and policy development.
- Intermodal linkage between the different transport systems.
- There is less of a focus on specific solutions, and more on developing human resources capacity and responsible institutions that can adapt to changing realities.

- Hitherto, transport policy did not focus enough on connectivity with other countries, and in border areas and the current Report highlights

[2] Source: PIB-Gist of Rakesh Mohan Committee Report

the significance of promoting connectivity within South and South East Asia regions.

- Special attention is also given to the transport needs of the North-East

1.1.2 Trends in Growth of Transport

Freight Transport is projected to grow 6 to 7 times and passenger traffic about 15-16 times over the next two decades, with the assumption of resumption of rapid economic growth of 7 to 9 percent per annum.

Railways and roads constitute the major chunk in the total transport spending. The share of modes other than railways and roads, which was around 15 per cent of total expenditure on transport in the first three Plans, escalated to 30 per cent in the Fourth and Fifth Plans, only to settle down at about 28 per cent in the Tenth plan and Eleventh Plan.

In the last decade, the civil aviation sector has grown at a phenomenal pace, and India has emerged as the world's ninth largest civil aviation market. The air traffic density (1000 passengers per million urban population) in India is very low at 72. China (282) is four times higher; Brazil (231) three times; Malaysia (1,225) 17 times, USA (2,896) 40 times, and Sri Lanka (530) more than seven times higher.

The performance of Indian ports has generally deteriorated over the years except for a brief period from the late 1990s to the mid- 2000s. The gap between the growth in traffic and growth of port capacity is apparently

widening. Port traffic is expected to grow by about 40 per cent from the current 914 million tons to about 1,279 million tons by the end of the 12th Plan. Thus, rapid up scaling of port capacities and commensurate financing is urgently required.

As regards Shipping, in 1990, the Indian fleet's share was as high as 35.5 per cent of the overseas trade, and the balance was carried by foreign vessels. But by 2011-12, the Indian fleet share was only 10.9 per cent.

Inland waterways in India are underdeveloped as a mode of transportation, despite their inherent advantages of fuel efficiency, environment friendliness, hinterland connectivity to less developed rural regions, and its capacity to shift large volumes of cargo from congested roads.

India's transport networks are severely constrained for capacity. India must adopt a holistic approach in designing integrated transport networks, and with substantial logistics infrastructure yet to be built, India can still make attempts to reach a more desirable and efficient state for its transport system.

While retaining the role for the government in infrastructure funding, there is a logical need for stepping up private investment to both fill the investment gap and also allow increased flow of public investment in perhaps

commercially unviable but economically and socially important investment decisions.

1.1.3 Overall Investment in Transport

If the country is to maintain a sustained high growth path over the next 20 years, a *new thrust* for more investment in overall infrastructure is inevitable. Fastest growing countries in Asia have consistently invested around 8-10 per cent of their GDP in infrastructure during their high growth period.

Sustainability of high economic growth would require continuing high growth of exports of goods and services which in turn is dependent on best transport connectivity and linkages.

NTDPC projections suggest that it should be feasible to raise adequate financing for transport investment from both domestic and foreign sources. Public sector investment will remain important and around 70 percent of public sector investment would need to come from central and state budgetary sources.

NTDPC has recommended that the overall investment in infrastructure should increase from an expected 7 percent of GDP in the 12th Plan to 8.1 percent in the subsequent three Plans till 2032. Public sector investment in infrastructure should rise marginally, from 4 per cent of GDP during the 12th Plan to 4.3 to 4.5 per cent in the next three Plans, and private sector investment from 3 percent to3.7 percent over the same periods.

Annual Investments in transport should increase from Rs. 2.2 trillion ($45 billion) in 2011-12 to Rs. 3.8 trillion ($70 billion) during the 12th Plan, and rise further to about Rs. 14 trillion ($250 billion) in the 15th Plan period (2027-2032). This implies an increase in investment from about 2.7 percent of GDP in the 11th Plan to 3.3 percent in the 12th Plan, and further to 3.7 percent in later Plan periods.

In order to arrest the significant erosion of Railways in its share of traffic there is need for a shift in emphasis toward greater investment in railways. Annual investment in railways should increase from Rs. 300 billion ($6.5 billion) in 2011-12 to Rs. 900 billion ($17 billion) during the 12th Plan, and rising to Rs. 4.6 trillion ($85 billion) in the 15th Plan period. This implies an increase from about 0.4 percent of GDP during the 11th Plan to about 0.7 percent in the 12th Plan, and further to 1.0-1.1 percent in the following Plan periods.

1.1.4 Strategy Proposed:

Government must adopt an integrated transport strategy guided by drivers such as long-term and largely irreversible nature; their far-reaching, game-changing effects on the economy and so on transport; their indifference to business cycles; and their relative immunity to financial and economic shocks. The overall aim of the integrated strategy should be to uncover an optimal modal mix that reflects the full resource costs of each transport mode for each type of commodity transported over various distances and terrains.

Pricing in the transport sector should conform closely to the cost of services and actual resources used in its production, having regard to scarcity values of these inputs. Subsidies should be limited to those areas where their retention on societal considerations is overwhelmingly justified and must be made as explicit as possible so that they are clearly identifiable to ensure transparency.

The key recommendations of NTDPC on policy front are as under-

a. Provisions in the Motor Vehicles Act (1988, as amended) should be effectively implemented.

b. The network of dedicated freight corridors must be speedily completed

c. Smaller new ports should be constructed at regular intervals along the coast to increase the number of origin-destination pairs and to increase the attractiveness of coastal shipping

d. Important regulatory agencies for inspecting shipments of food, pharmaceuticals, textiles and biological matter should have on-airport offices. These agencies and laboratories should be integrated into a common information technology system shared with customs, airports and cargo service provider.

e. With respect to the movement of liquids and gases via pipeline, a National Pipeline Grid could be established along the lines of the National Electricity Grid

f. Logistics parks should be established at major transportation hubs including at the origin and destination points of Dedicated Freight Corridors (DFC), and at major industrial centres or near major urban conurbations

g. A new central body, the Central Logistics Development Council (CLDC) comprising of industry members, ministry representatives, and financial and academic institutions should be set up with the mandate of promoting the logistics industry

As per the committee observations, India's transport policy environment is fragmented between modes and level of government, with infrastructure investment planning, policymaking, regulatory oversight (to the extent that it exists), and financing strategies scattered across and within levels of government. India's governance of regional transport corridors is also somewhat more centralized than international practice for intergovernmental division of responsibility.

An "integrated" approach to transport planning does not mean centralised decision-making, but rather setting up of systems for information flow, knowledge generation, and continuous, interactive dialogue between relevant organisations throughout the project cycle.

1.2: Road Sector Outlook:

The currentUnion Minister of Road Transport, Highways and Shipping,ShriNitinGadkari very often quotes a famous statement of John F. Kennedy that says "**American Roads are good not because America is rich but America is rich because American Roads are good**". Driven by this philosophy, the concerned ministry, aligned with successive governments' policies, is pushing to develop a strong network of **roads** across the country. In the last couple of decades India has embarked upon creating an integrated Infrastructure with a view toachieving accelerated economic growth.Of all the infrastructures, *road* is the most fundamental and essential requirement. India has the second largest road network across the world after USA. The road network transports more than 60 per cent of all goods in the country and 85 per cent of India's total passenger traffic.

The Government of India has envisaged huge investment in the road sector during the current five year plan (2012-17). Table 1 indicates length of different type of roads in India as on September, 2016.

Table 1: Different Type of Road Lengths

Type of Road	**Length (In Km)**
Expressways	2000
National Highways	1,00,087
State Highways	1,48,256
Other Roads	49,83,576

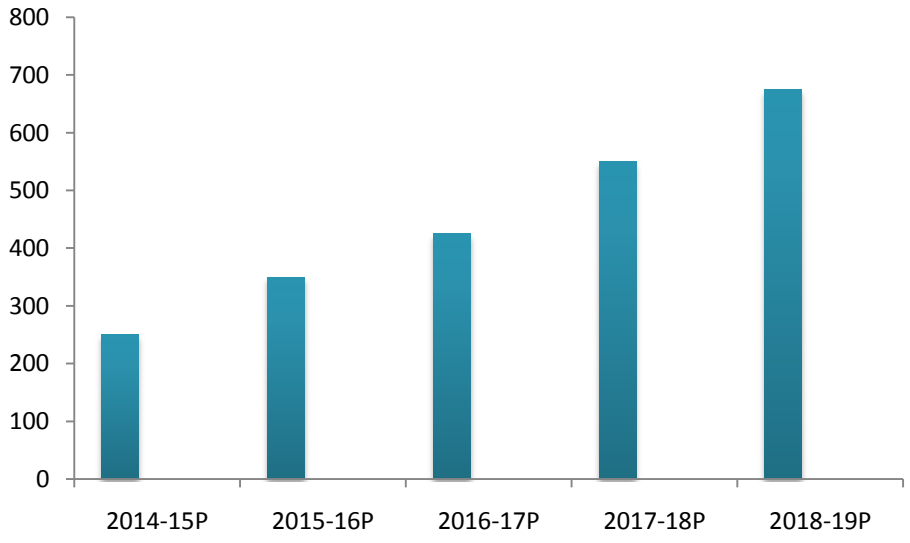
Source: NHAI Report on Highways development, 26th September, 2016

The Central Government alone under National Highways Development Projects (NHDP) has planned to achieve the target of completion of Highways, with 4 or more lanes, within 12th Five Year Plan with a total length of 32750 kms.The estimated fund requirement for achieving this ambitious target is Rs 3, 23,774crore, out of which, share of private sector is expected to be Rs 1, 66,738crore[3].

A white paper on Road Sector in India by CRISIL and PHD Chambers published in February, 2015, National Highways Outlook for five year period i.e. from 2014-15 to 2018-19has projected the growth in this sector as shown in figure1, figure 2 and figure 3 below.

Investment in National Highways:

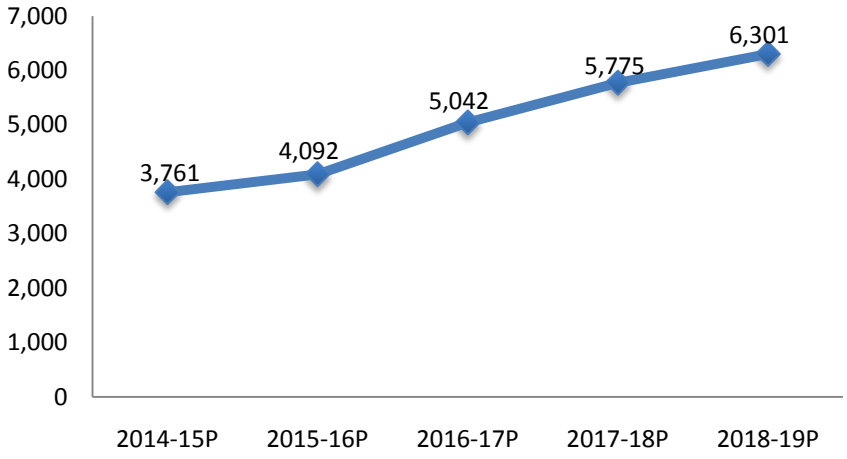
Figure 1 : Investments (Rs. Billions) with projections



[3]MoRTH 12th Five Year Plan(2012-17) Report of the Working Group on Central Road Sector

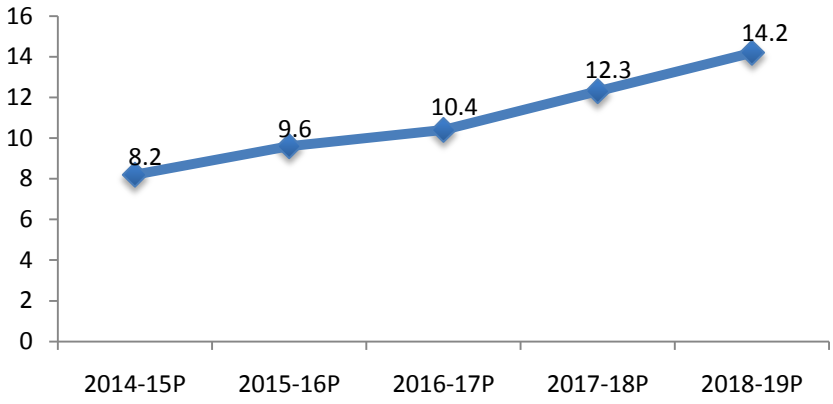
Road Lengths Awarded by NHAI:

Figure 2: Length Awarded (in km) with projections



Per day road construction by NHAI:

Figure 3: Length Constructed (km/day) with projections



The paper has projected around 12 to 14 Km per day road construction in India but as per the separate media reports[4] the union minister of road transport highways and shipping has declared to construct road at the rate of 30 km per day.

As per MoRTH records, the construction of highways had reached an all-time high of 6,029 km during FY 2015-16, and the increased pace of construction is expected to continue for the coming years.The financial outlay for road transport and highways grew at a CAGR of 12.5 per cent between FY2010-2016.The plan outlay for FY2016-17 stepped up budgetary support for Road Transport and Highways to Rs 97,000 crore (US$ 14.46 billion).

[4] The Hindu (New Delhi Edition, March 9, 2015)

Key Investments/Developments:

Some of the key investments and developments in the Indian roads sector are as follows:

Power Finance Corporation Limited (PFC) has provided a financial assistance of Rs 13 crore (US$ 1.94 million) and collaborated with National Green Highways Mission (NGHM) under National Highways Authority of India (NHAI) for plantations work on NH7 in Nagpur region under their 'Adopt a Green Highways' Program.

Indian Institute of Technology, Kharagpur (IIT-Kharagpur) and National Highways Authority of India (NHAI) have signed a Memorandum of Understanding (MoU) for research project to develop technology to construct maintenance free highways in India.

Beyond 12th five year plan National Highways Authority of India (NHAI), nodal agency for Highway construction, under Government of India, plans to invest around US$ 250 billion[5] (INR 17 lakh crores) in 240 road projects spanning 50,000 kms over the next five to six years.

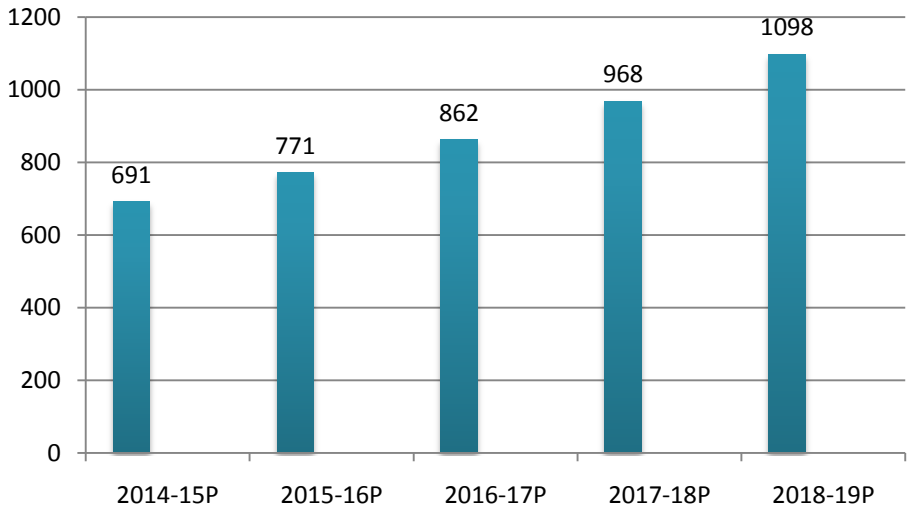
Growth of State Roads:

In line with Central Government's highways development policies, the state governments are also laying emphasis on construction of roads in respective states.

[5] The Economic Times (Delhi edition, February 17, 2016)

Figure 4, below shows the projected investment growth in State Roads[6] across the country during the period from 2014-15 to 2018-19.

Figure 4 : Investments (Rs. Billions) in state roads with projections



The white paper by CRISIL and PHD Chambers has disclosed that the total investments in state roads in the past five years is estimated to be around 2.3 trillion which is expected to increase at 12% on an average in the next five years. Though in the past years, most of the state roads constructed were on the EPC mode, many states have now started to increase private sector participation in road projects via the PPP mode. The states that are extensively evaluating PPP as a preferred mode for road projects wherever feasible include Andhra Pradesh, Bihar, Gujarat, Haryana, Karnataka, Kerala, Maharashtra, Madhya Pradesh, Tamil Nadu, Rajasthan and Uttar Pradesh.

[6] As per white paper by CRISIL and PHD chambers

1.3 Modes of Financing the Road Projects

The road sector being highly capital intensive, it is almost impossible to create infrastructure of this large proportion merely through budgetary support and therefore arranging funds for construction of roads has become a challenge before the Government. In order to accomplish this gigantic task, the Government has considered adoptingmultiple financing strategies.

For National Highways:

As could be seen from table 1, National Highways have less than 2% share in the total length of Roads in India but cater to 40% of the total road traffic that indicates a huge demand supply gap in this sector and needs special efforts to fill this enormous gap. In this section, the various financing mechanisms adopted for funding central highway projects will be discussed. Ministry of Road Transport and Highways (MoRTH) implements central government's highway policy mainly through four executing agencies namely-

1. National Highways Authority of India (NHAI)- For National Highways
2. State PWDs- For National Highways in Respective States only
3. Boarder Road Development Board (BRDB)- For Highways on Border Areas and
4. National Highways Infrastructure Development Corporation Limited (NHIDCL) - mainly for Highway Development in North Eastern States.

NHAI has almost 90 % share[7] in development of national highways in the country. And therefore for all purpose, in this study, the construction agency will be referred only as NHAI except when specified otherwise.

Conventionally, till recent past, most infrastructure projects were executed through **EPC** (Engineering, Procurement and Construction) mode. In this model, the executing agency, after successful completion of the project is given full payment of its part and the Government remains the owner of the asset. The projects were funded through budgetary support from specially created funds like Central Road Fund(CRF) collected as cess on petrol and high speed diesel and Road Tax on Vehicles as per MV Act especially for state roads. However the EPC mode suffered serious limitation of slow progress, poor quality and lack of accountability on the part of contractor once the project was completed and handed over to the government.

After economic liberalization in India, in order to meet the accentuated need of road construction across the country, the budgetary support model proved to be grossly inadequate and therefore alternate modes of funding and revenue generationhad to be evolved thusthe concept of PPP (Public Private Partnership) gained momentum for big value projects in India. In PPP mode the private entity called Concessionaire (generally a consortium or joint venture) not only builds the asset but also operates and maintains the same for the entire contract period (concession period), before transferring the asset to the owner i.e. the Government. This process is called BOT (Build, Operate and Transfer).The concessionaires are selected through competitive bidding by defining the financing

[7] As gathered during discussion with MoRTH officials

mechanism upfront in the bidding documents. In most of the cases, the PPP projects are awarded mainly based on the following financing modes[8]-

1. **BOT (Toll)**: The salient features of this model are as under-

i) The bids are invited with provisions of Viability Gap Funding (VGF). For six lane projects VGF can be upto 10% of estimated project cost and for four lane projects the VGF can be upto 40% of estimated project cost.

ii) The estimated project cost consists of civil construction cost (cost of material, labour, mobilization of resources, statutory expenditures etc.) plus finance cost which is 2 percentage pointshigher than bank rates plus Economic Internal Rate of Return (EIRR) which is taken as 15% of sum of civil construction cost and finance cost.

iii) The bidder who quotes minimum VGF based on the user fee and yearly targeted traffic mentioned in the bid documents is awarded the project and becomes the concessionaire for the project. The Letter of Intent (LOI) is issued to the concessionaire. LOI indicates, among other things, the agreed VGF, Total Project Cost (TPC) which is the estimated project cost plus VGF.

iv) The concessionaire meets the finance requirement for the project through VGF, own equity and bank loans.

v) Within six months of issue of LOI the concessionaire, completes the financial closing also called the final close.

vi) In final close the concessionaire, discloses his equity and debt details, creates an SPV as EPC contractor, signs substitution contract and completes escrow agreement etc.

[8] As per the guidelines and within the framework of MCA document approved by Planning Commission with modifications from time to time

vii) On completion of all activities as mentioned at sl no. vi) above, Appointed Date is fixed, which is considered the day of beginning of the concession period for all purpose.

viii) Model Concessionaire Agreement comes into effect from Appointed Date. The concession period is stipulated in MCA and is generally 20 years.

ix) The government/NHAI makes VGF payment to the concessionaire as per the milestones defined in MCA within construction period which is generally two and half years.

x) After completion of the project the concessionaire starts collecting user fee called ***toll*** from the users of the highway as per the conditions of MCA. MCA provides review of target traffic after 10 years of the Appointment Date and the concession period is reduced or increased depending on the target traffic situation.

2. **BOT (Annuity)**: The salient features of this model are as under-

i) In this model there is no provision of VGF and the bids are invited based on the Annuity Amount. The bidder quoting minimum annuity for the entire concession period is considered successful and becomes the concessionaire for the project.

ii) In this model the Estimated Project Cost differs slightly from the BOT (TOLL) model to the extent that the finance cost is taken 2.5 percentage points higher than the bank rates, as against 2 percentage points taken for BOT (Toll) model.

iii) After completion of project the concessionaire is paid six- monthly annuity during the concession period, duly linked with WPI.

iv) The project funding by the concessionaire is done through debt/equity method.

v) During the concession period O&M is carried out by concessionaire and the toll collection is done by NHAI.

3. **Hybrid Annuity Model (HAM)**[9]: This is relatively a new concept. The salient features of this model are as under-

i) In this model bids are invited based on estimated bid price and first year O&M cost. The Total Project Cost (TPC) is arrived at by adding the estimated bid price by the bidder and cumulative cost of O&M for entire concession period using a predetermined formula in the bid documents. The offer with minimum TPC is accepted and the bidder becomes the concessionaire for the project.

ii) The only difference would be that in the estimated project cost the finance cost is taken 3 percentage points higher than bank rates as compared to 2 percentage point taken in BOT (Toll) model.

iii) 40% of estimated bid price is paid to the concessionaire during construction period as per the defined milestones in the MCA, duly linked with WPI. The balance funding is arranged by the concessionaire through debt/equity mechanism.

iv) The balance amount including O&M charges is paid in six monthly annuities with incremental percentage basis linked with WPI in 15 years. For example first annuity will be 2.10 percent of balance completion cost and last annuity will be 4.74 percent of balance completion cost.

v) The toll is collected by NHAI for the entire concession period subject to the conditions of MCA.

[9]The Cabinet Committee on Economic Affairs (CCEA) has approved a hybrid annuity model for implementing highway projects, which adopts a more rational approach to allocation of risks between the government and the private developer, and is hence expected to revive highway projects construction in India.

For State Roads: In order to partly support state road development projects, Central Government[10] has created a window for providing viability gap funding (VGF) upto an amount of 20 percent of the project cost. Additional cost of 20% of project cost can be provided by the State Government to the private entrepreneur in order to leverage private financing of the projects under Public Private Partnership (PPP) model. The State Highway Development Projects (SHDP) would need the support of the government budget as the revenue generation from the existing resources is not sufficient and also the private investors are not forthcoming for state road projects due to various reasons ranging from government instability, viability funding issues and the issues related with toll collection. For this, the support of the World Bank/ADB and JICA towards financing of these roads needs to continue. Preparing a blue print of identified major state road sections for PPP will help the states to achieve its part financing needs. Implementing the projects would enable states to achieve its growth objectives.

1.4 Source of Funding the Highway Projects:

The main source of allocation to central road sector comes from fuel cess and collection of user fee i.e. toll. The fund allocated to the ministry is used for paying VGF for BOT (Toll) projects and for paying Annuity for BOT (Annuity)and HybridAnnuity projects.

The toll collection being an important source of revenue for the Government plays a significant role to fund the highway development projects. The Table 2, below

[10]MoRTH12th Five Year Plan (2012-17) Report of the Working Group on Central Road Sector.

shows the progressive increase of highways length and toll collection for five consecutive years.

Table 2: Progressive Increase of Highways length and Revenue Collection

Year	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**
Length(km) Progressively	9,520	10,996	13,358	15,507	16988
Toll (Rs Cr)	5,448	7,033	9,222	11,387	14,171
CRF[11] (Rs Cr)	N/A	18738.3	19404.38	19632	21400

Source:MoRTH website

As proposed in the budget 2017-18, Rs 55,369 Crore which is 85% of the total allocation to MoRTH will come from above-stated two sources of revenues i.e. CRF and Toll Collection.

1.5 Recent Government Decisions[12] on Various Financing Modes:

The Government of India had planned to award 100 highway projects under the Public-Private Partnership (PPP) mode in 2016, with expectations that recent amendments in regulations would revive investor sentiments in PPP projects in the infrastructure sector.The Cabinet Committee on Economic Affairs (CCEA) has permitted 100 per cent equity divestment by private developers after two years of construction completion for all Build–Operate–Transfer (BOT) projects, irrespective of the year of award of the project.The Government is looking at bundling public-funded national

[11] http://arthapedia.in/index.php?title=Central_Road_Fund_(CRF) as on March 10, 2017

[12] India in Business, Ministry of External Affairs, GOI, Economic Diplomacy Division updated in October, 2016

highway projects that can be monetised by leasing out to private players for toll collection, which would enable the concessionaire to achieve economies of scale, synergy in operations and achieve an appropriate investment size.For further facilitation, The Cabinet Committee on Economic Affairs (CCEA) has approved a hybrid annuity model for implementing highway projects, which adopts a more rational approach to allocation of risks between the government and the private developer, and is hence expected to revive highway projects construction in India.

India and Japan are planning to enter into a partnership and launch an infrastructure finance company which will provide soft loans for Indian road projects with a credit target of Rs 2 lakh crore (US$ 29.82 billion).

1.6 Objectivesof the Study:

The purpose of this research study is to-

1. Understand the underlying policy rationale behind fixation of toll rates at various stretches of the national highways being constructed by NHAI and state highways by state governments.

2. Evaluate the implementation process of some of the popular highways in India with a comparative study of highways constructed by NHAI/ state governments.

3. Understand the international toll framework scenario

4. Suggest recommendations and exploration of alternate methodology to make the highways either toll free or less cumbersome to enable free flow of vehicles at toll plazas.

1.7 **Research Questions:**

1. What is the policy framework for toll tax both at National and State Level?

2. What are the criteria to determine the rates and duration of toll tax?

3. How can the toll collection be made a hassle free activity by appropriate policy intervention and suitable technological leveraging?

4. What are the international practices in the public use of highways?

1.8 **Methodology:**

This research work isfundamentally an exploratory study.The policy and legislative framework has been analysed by interacting with ministry/department officials at Centre and State levels to understand the policy rationale behind the present system of toll collection and future strategy. The sources of data are both primary and secondary

The PrimaryData is collected from the policy document and record books of governments/PSUs offices and through field visits of toll plazas of following three identified roads.

1) **Ahmedabad- Vadodara Mahatma Gandhi Expressway**- This expressway is the first in the country awarded by NHAI with sweetener[13] concept. The new expressway work is clubbed along with improvement work of existing National Highway-8. Also the expressway is fully access controlled and has introduced ETC at the time of commissioning. This project was selected for study to compare with the other two projects undertaken by respective states.

2) **Mumbai- Pune Expressway:**This being the first expressway with complicated topography having large number of tunnels and bridges is considered one of the best managed expressways with 17.5 % toll collection growth in the current financial year, mainly on account of increase of traffic[14].

3) **Ahmedabad-Viramgam-Maliya State Highway**- This highway has been constructed by Gujarat State Road Corporation on BOT(Toll) basis. The highway is considered critical from the view point of transportation of heavy goods from two very important port trusts in India, Kandla and Mundra. This highway has the distinction of generating more revenues from MAVs (multi-Axle Vehicles) as compared to the Cars/Jeep and Van category. Highway was chosen for comparing with the performance of one national highway being operated by NHAI and other state expressway being operated by Maharashtra state government.

[13] Elaborated in Chapter three section 3.1
[14] As reported in The Financial Express(Mumbai Edition,September26, 2016)

Besides, the information has been collected from various stakeholders, viz. officers from Centre/states, and representatives of the Concessionaire and users, with the help of interviews/semi structured questionnaire.

Secondary Data: Secondary data and information has been collected from News Paper articles, books, journals, annual reports of the concerned ministries/organizations, internet.