

Constraints, Issues and Challenges in Public-Private Partnership (PPP) Model in Road Construction Industry

As per Indian Perspective

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Abstract - With over 4.6 million km, India has the second largest road networks in the world. Unfortunately the road development fails to meet the growing up needs due to limited budget allocation. This has made the government of India realize the importance of involvement of private sector in the road development. Therefore, PPP has considerably scaled up in the last decade. PPP, undoubtedly, is one of the best efforts that has been taken by the Government of India. Numerous infrastructure projects have been constructed by PPP but at the same time many questions have been raised: What are the reasons for the delay of the PPP road projects? Why are the projects still inferior in comparison to the output that nations, like USA, China etc. have achieved through the same model? At one hand, considering India's need, PPP is not just a choice but a compulsion. But on the other hand, there are number of issues which have to be solved out. This paper highlights various such issues which persist directly or indirectly at various stages of progression of a road project under PPP scheme. The paper also finds out the root causes of several issues with the help of data sources and past experience of effected projects from project announcement stage to execution stage. A case study of road projects under PPP scheme in China has been considered into account in this paper for better understanding of the lessons to be learned. Apart from the aforesaid, the major issues directly related to limited participation of private sector under PPP scheme have been summarized. The need to carry out this paper work is strongly felt for its readers to bridge the gap between issues and prospects of the Indian PPP model in road construction industry.

Index Terms – PPP, MORTH, NHAI, BOT, ROAD.

Acronyms

BOT	Build, Operate and Transfer
DBFO	Design, Build, Finance and Operate
DPR	Detailed Project Report
GOI	Government of India
IC / IE	Independent Consultant / Independent Engineer
IRC	Indian Road Congress
MCA	Model Concession Agreement
MORTH	Ministry of Road, Transport and Highways
NH / SH	National Highways / State Highways
NHAI	National Highways Authority of India
NHDP	National Highways Development Project
PMGSY	Pradhan Mantri Gram Sadak Yojana (Prime Minister's Rural Roads Program)
PPP	Public Private Partnership
PWD	Public Works Department
R&R	Resettlement & Rehabilitation
SDRC	State Development and Reform Commission
SOEs	State Owned Enterprises
GTS	Geo-Technical Services
ASSOCHAM	The Associated Chambers of Commerce and Industry of India

I. INTRODUCTION

General

Public Private Partnership (PPP) as per Government of India means a long term contract or concession agreement, between a Government or statutory entity on the one side and a private sector company on the other side, for delivering an infrastructure

service on payment of user charges (Singh, 2011). According to Committee on Infrastructure Financing, 2007, India invested close to USD 400 Billion in the period 2006-2011 in infrastructure development, at least 40% of which was developed through Private Public Partnerships (Committee on Economic Affairs, India, 2007a). This shows that interest of private sector which is readily participating in infrastructure development. For instance, PPP projects attract more number of bidders in road sectors in the road sectors than they did 5 years ago. (Committee on Economic Affairs, India, 2007a)

Background

In Seventh Year Plan (1985-89), The Planning Commission of India, emphasised to look for alternative funds resources and therefore the PPP era started in early 1990s. Thus PPP has scaled up gradually in the last ten years. Historically, Government of India has been the major source of financing for the major infrastructure projects. In order to keep pace with the growing traffic, emphasis on road development increased with the proceeding Government's Five Year Plans. But due to decline in funds allocated to road infrastructure development, the inadequacies like capacity constraint, congestion, fuel wastage, and delay increased. Apart from the budgetary throttle, the technical aspect was weak too, which lead to time and cost overrun. The ability to finance infrastructure that financially bounded governments are unable to provide and the expectation of efficiency that a profit-motivated private operator can bring have led to exponential increase of PPP model in India (Gomez, Osius, & Lorrain, 2004). The two significant changes in the 12th Five Year Plan from the 11th Five Year Plan show that the government has recognized the importance of private sector investment: (i) the total outlay for infrastructure in the 12th Five Year Plan is twice that of the outlay in the 11th Five Year Plan, and (ii) the percentage share of private sector investment is expected to grow to 50 % in the 12th Plan compared to 30 % in the 11th Plan. (Public Private Partnerships in India: Lessons from Experience, 2012)

However the blind trust and high expectations from PPP fall short at many places. Many PPP projects also encounter several risks that often lead to cancellations and/or significant renegotiations. Evidences from developing countries indicate that actual or perceived rise in tariffs, macroeconomic fluctuations in currency or purchasing power, inadequate regulatory and institutional environments, societal discontent against the private sector and political renegeing are some of the key reasons for the failure of PPP projects (C., 2003), (Gomez, Osius, & Lorrain, 2004), (Klein & Roger, 1994). Figure 1 below represents the current road network of India.

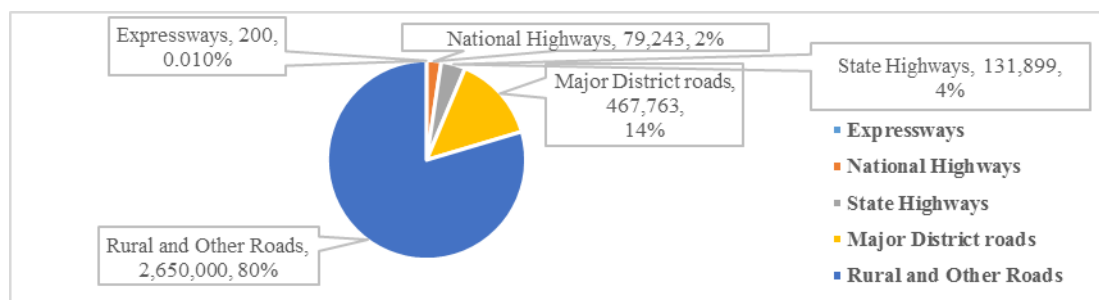


Figure 1: Indian Road Network, Source: (NHAI India, 2014)

II. OBJECTIVE AND METHODOLOGY

Objective of the study

Road project is known as one of the most complicating and cost demanding projects, especially when the infrastructure of this project needs to be constructed from the scratch. That's to say, there is no Construction Company able to undertake the whole project phases (planning, designing, constructing, operating and maintaining) by itself considering budget, finance and funding requirements. Therefore, the importance of PPP merged with the conventional contract strategy. Logically, tasks allocation between private and public bodies facilitates daunting projects. So less construction time and more efficient and convenient roads are expected as a result from this cooperation. Frankly that is not the case in India. Delays in construction phases, huge budgets and defects are the dominating features of the roads which are the outcomes of PPP contracts in India. Hence, many questions pop up: What are the problems of PPP in road construction industry? Is the failure likely to happen from the private association side or the public one? What to learn from previous experiences in order to avoid such problems in future? Answering these questions is the main objective of this paper.

Methodology of the study

To have the former objective fulfilled a detailed information about PPP should be expounded. Therefore, various models of PPP contracts are addressed in this paper. There are a lot of PPP models considering several kinds of structural projects. However, only models concerning road projects are taken into consideration. The process involves responsibility and risk sharing in order to reach the key issue of PPP contracts and find out whom to blame in case of dilemmas. Moreover, the project flow in PPP model is interpreted starting from project announcing phase and through project execution phase till operating phase. Subsequently, the bottlenecks in each relative phase are identified and examined properly.

Afterwards, issues which limits effective participation of private sector is provided to accumulate all PPP's issues in India with a view to compare them with the ones in China. Eventually the results of this comparison are within reach, so many lessons could be learned and many future drawbacks could be avoided.

III. CONSTRAINTS AND KEY ISSUES IN PPP MODEL FOR ROADS

General

The entry of Public-Private Partnership (PPP) into Indian road construction industry has played a vital role in the development of expressways, national highways and state highways. The engagement of private sector into infrastructure procurement is advantageous in many ways. Foremost amongst these are (a) the ability of the private sector to finance infrastructure that cash-strapped governments are unable to provide and (b) the expectation that a profit-motivated private operator can bring about enhanced operational efficiencies. (Gomez, Osius, & Lorrain, 2004)

Models of PPP adopted in India

The two models of PPP adopted in India for the development of National as well as State Highways are BOT (Toll) and BOT (Annuity). Apart from these two, OMT (Operation Maintenance and Transfer) does not actually include development of the road. Another model concession agreement was developed by Planning Commission, Government of India, for road projects taken up on a Design-Build-Finance-Operate (DBFO) basis which is also a hybrid of BOT-Toll model. The various risk factors and net cash outflow of these models are presented below in Table 1.

(a) *BOT (Toll) Model*: In the BOT (Toll) model, the Concessionaire recovers his investment by charging toll from the users of the road facility. This model reduces the fiscal burden on the government while also allocating the traffic risk to the Concessionaire. This is the model used for most of the projects and can be regarded as the default model for highway projects. (MORTH India, 2014)

(b) *BOT (Annuity) Model*: Under a BOT annuity model, the Concessionaire is assured of a minimum return on his investment in the form of annuity payments. The Concessionaire does not bear the traffic risk and the Government bears the entire risk with respect to toll income. (MORTH India, 2014)

Table 1: Various Modes of PPP

Modes of Development		Development Risk	Financing Risk	Traffic Risk and Accrual of Toll Fee Collection	Net Cash Outflow for the Government
BOT-Toll	Premium	Concessionaire	Concessionaire	Concessionaire	No
	Grant	Concessionaire	Concessionaire	Concessionaire	Yes
BOT-Annuity	-	Concessionaire	Concessionaire	Authority	Mostly Yes, Net Payment to be made in the difference between the toll collection and the annuity payable
OMT		Only Maintenance work of Shoulders /Paved Shoulders	Concessionaire	Concessionaire	No

Source of Data: (ASSOCHAM India, 2012)

Stages of Project Flow in PPP model

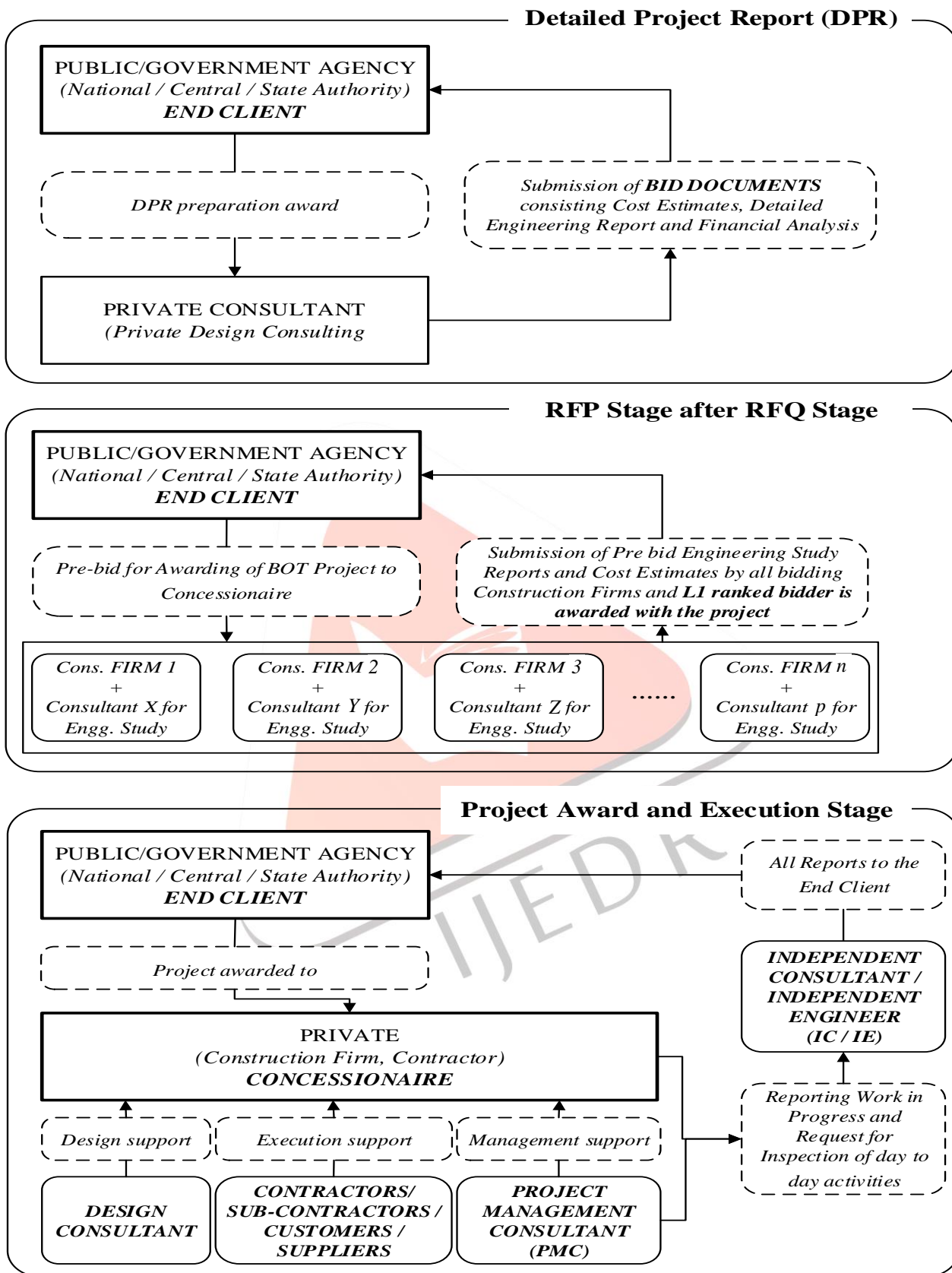


Figure 2: Stages of a project Flow in PPP model adopted in India

The figure 2 as shown above is drawn as per the past experience of one of the author of the paper. The hierarchy of a project flow as shown in the chart is self-explanatory for different processes which a project undergoes from DPR stage to 2-stage bidding process and finally to execution stage. The current industry framework is to first offer the project on BOT (Toll). If due diligence indicates the project to be unviable on BOT (Toll) in the first instance itself, then it should be offered on BOT (Annuity) basis.

DPR Stage:

In this stage the consultant is supposed to prepare Bid documents which include detailed engineering report, cost estimates, model concession agreement (MCA), financial analysis and other clearance reports for the Government body. The Model Concession Agreements (MCAs) for PPPs in the road sector is basically a Contractual agreement between the Client (Public) and the Concessionaire (Private). The MCA states the flow of project which takes place in two-stage bidding process namely RFQ and RFP as per the hierarchy of project flow in the figure 2 above.

RFQ Stage:

The first stage is generally referred to as the Request for Qualification (RFQ) stage, which is to pre-qualify and short-list eligible bidders for second stage of the process.

RFP Stage:

The second and final stage of the bidding process, which is generally referred to as the Request for Proposal (RFP) stage, is aimed at obtaining financial offers from pre-qualified bidders after the RFQ stage.

Issues Identified at Various Stages of a PPP Road Project

This section of the paper identifies issues based on the past experience of some delayed or abandoned projects and they have been listed and described with their causes at various stages of a project flow in a PPP model as per the methodology adopted.

Constraints and Challenges at DPR Stage:

The constraints at DPR stage are usually challenging as this stage is the primary platform before any road project reaches the point where it is ready to be bid. These constraints, if not tackled up on the spot, may pertain throughout the end of the execution stage. The following are the issues which are faced by the consultant while carrying out the engineering investigation and preparation of DPR.

- Need of permissions from various separately operating authorities for carrying out activities on site during site investigation studies.
- Topographical Survey inaccuracy due to unavailability/presumption of GTS benchmark and later some of them displaced due to geographical land use changes.
- Challenge to maintain the displacement of the marked pillars of Right of Way on site by local habitants.
- Rough Estimation of Land Acquisition details, which might be caused by urgency in DPR submission, leads to huge delay problems and road right-of-way contradiction for carrying out execution in later stages.
- Constraints leading to Design Tolerance.
- Delays in Financial Closure of the Project.

Delay in Project awards at Bidding Stage (RFQ and RFP stage):

Over the past few years, there has been shortfall in PPP project awards due by NHAI due to the constraints at bidding stage. Table 2 shows that in 2010-11, only 56% of the target kilometres that was planned for award was actually awarded and in the next year, the situation was similar with just 51% of the target achieved.

Table 2: Targets, Achievement and Performance of Road projects in PPP

S. No.	Year	Target awards (km)	Actual Awarded (km)	Percentage of Target Achieved
1	2010-2011	9000	5059	56 %
2	2011-2012	7995	4083	51 %

Source of Data: (ASSOCHAM India, 2012)

Seeing the past years achievements, it can be relatively expected that targets for the current year should have been reduced by the NHAI in order to cover the backlog construction. But referring to the table 3 from the MORTH, it can be clearly understood that the current year target awards of the projects are relatively higher and this may be due to increasing demand of highways to be developed. To achieve this higher target the average daily construction target rate of NH in India must be 23.3 (=8500km / 365 days) km per day as per the calculations from the table 3.

One of the major issues here is that the average daily construction target rate of NH in India has reduced from 20 km per day in year 2013 to 17.26 km per day in year 2014 as in table 5, which means in a year only 6,300 km length of road can be developed if 100% of achievement rate per day is accomplished. This is the main cause of delay in project awards every financial year. These differential project numbers from the actual target moves further into the next financial year and hence they are delayed. The similar is the case with state highways projects and many state governments are finding it difficult to create the shelf of PPP projects.

Table 3: Targets and Performance

S. No.	Parameter	Target (2014-2015)	Achievement (April-Oct 2014)	Percentage of Target Achieved till date
1	Road Length to be Awarded (km)	8500	3419	40.22 %
2	Completion of Construction (km)	6300	1984	31.49 %
3	Highway Length Tolled (km)	3730	435	11.66 %
4	Collection of Toll revenue by NHAI (INR billions)	6500	3584	55.14 %

Source of Data: (MORTH India, 2014)

The column chart in the figure 3 below shows the reduction in achievement of project awards in the last few years. As such it is more challenging to overcome this issue in order to avoid backlogs of project awards in every following year. The main constraint being the improper management in planning input resource and expected outcome.

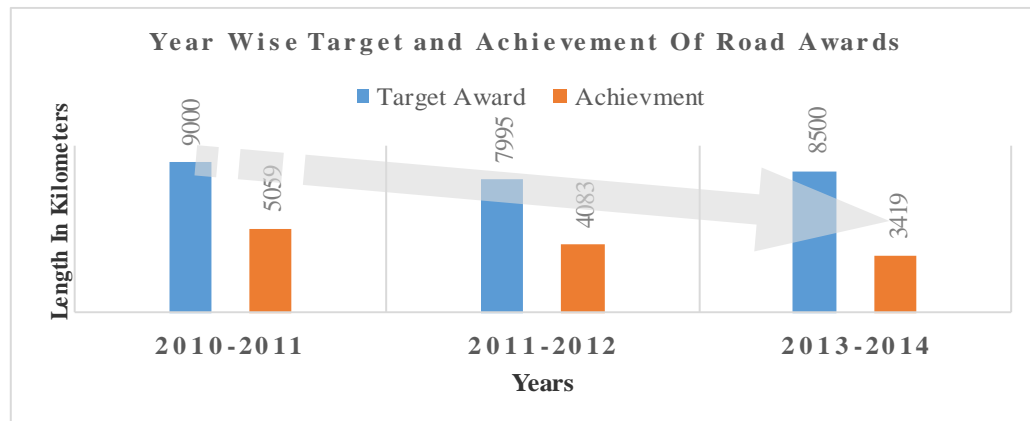


Figure 3: Year wise target and achievement of road awards
Source of Data: (MORTH India, 2014)

Delays after awarding of project in Execution stage:

The execution of national and state highways in India is declining consistently year by year if compared with the targets that were set in the preceding year. This declination is directly proportional to and affects the target rate of road construction per day. Referencing to the previous year's target, the length of road (NHDP) to be constructed was 3165 km. This has to be increased by about 200% to 7300 km to achieve 20 km of road construction per day. However, the construction during the year was only 2693 km showing achievement compensation of 85%. . The speed of construction fell further in the year 2010-11 to 1780 km (71% achievement) and to 822 km (33% achievement) in year 2011-12 (up to October 2011). In financial year 2011-12 (up to October 2011), only 4.5 km road was constructed per day on an average. This is far below the set target. (ASSOCHAM India, 2012)

Issues causing the delay in execution

Considering the delays and other effects in this stage, its main causes must be highlighted in order for them to be taken as a challenge to fix them. Following are few of the major causes as per the past experience of some delayed road construction projects.

- Land acquisition issue is the primary one in which landowners are compensated based on the value of land prior to development. This often leads to a feeling of injustice and social protests when, post-development, the value of the same land increases multi-fold.
- Project management issue results in delay due to poor management of manpower and machine resources by the private sector and can only be addressed by improving project management practices and value engineering.
- Sudden Change of Scope (COS) for any additional work in between the project execution incurs additional contractual letters, resource planning, cost estimation and man-hour to work on which delays the ultimate finish line of the overall project.
- Inadequacy in the material supplied to the contractor results in corresponding task activities to pause in between and the whole process of material investigation in search of good source and least lead is carried out.

Moreover, a sample of 25 PPP projects, which were awarded earlier and were likely to be completed by November 2011, were studied to assess the compliance with project schedule. It was observed that the minimum delay is four months and the maximum delay is 37 months. The average delay per project was around 22 months as presented in table 4 below. (ASSOCHAM India, 2012).

Table 4: Delay in Project Execution

No. of PPP projects studied	25
Minimum delay	4 months
Maximum delay	37 months
Average Delay	22 months

Source of Data: (ASSOCHAM India, 2012)

These issues need to be addressed if we are to achieve the desired target of 17.26 km road construction per day as per the table 5 below.

Table 5: Efficiency Parameters

S. No.	Efficiency Parameters	Achievement During 2013-14	Target 2014-15
1	Average Construction of Roads in km/day	11.67	17.26
2	Average award of works per day	8.68	23.28
3	% of Toll plazas covered with ETC	<10%	100%
4	Reduction in number of fatalities	686	2000

Source of Data: (MORTH India, 2014)

Issues related to participation of private sector in the development

The Government of India has undertaken several steps to create an enabling framework for private sector participation in the development of the National Highways network. There are, however, certain issues limiting greater participation of the private sector in the development of road projects through the PPP route. Some of the issues include the following: (Kalidindi & Singh, 2009)

- The current policy of offering the project first on BOT (Toll), then on BOT (Annuity) and then on engineer procure and construct (EPC) contract is likely to introduce delay in the implementation of the project since government approval is required at each stage.
- In case of the BOT (Toll) model, the degree of risk exposure to the concessionaire is high and the private sector is reluctant to take high-risk exposure. On account of this, there has been very low private sector participation in bidding of projects that are to be developed through BOT (Toll) route.
- Though BOT (Annuity) exposes the concessionaire to a lower level of risk, the cost of the project procured through the BOT (Annuity) route is higher. The cost of private capital is comparatively higher compared with the sovereign cost of borrowing.
- The bidding process for PPP road projects has been standardized with the introduction of model RFQs and RFPs. There has been a lack of investor interest in the PPP road projects on account of certain clauses in both the model documents. For instance, as per the model RFQ, only six applicants will be short-listed for the bidding stage based on their respective aggregate experience score. And, as per the model RFP, the bidder will be ineligible for bidding if the bidder was: (1) pre-qualified for the bid stage (second stage of bidding process) in relation to eight or more projects, (2) declared as the selected bidder for undertaking four or more projects, or (3) unable to achieve financial close for two projects within the stipulated time during the period of two months preceding the bid due date.
- As per the MCA, risk allocation has been based on the underlying principle of allocating the risks to the parties best suited to manage them. However, there are certain risks such as land acquisition risk, which in spite of being allocated to the party best suited to manage the risks, has been a major cause for delay in timely completion of the project. (Kalidindi & Singh, 2009)

IV. CASE STUDY AND RESULT COMPARISON

General

To further study the constrains of PPP in India, case study was undertaken in a developing country, China, which has the similar size and population to India but has better performance on road construction with PPP model.

China Case Study

At the beginning of 1990s, India's road construction industry was superior to its Chinese counterpart. Resultantly, the road network in India was more extensive than that in China. However, during the later decades, China's highway development rate surged ahead when China introduced PPP/BOT financing model into the road construction. (The World Bank, 2005)

After China opened up for reform, road infrastructure developed quickly, leading to high demand of road construction funding. As a result, instead of funding by government or local bank, Chinese government encouraged private companies into public road construction project via PPP model. The first PPP project in China was conducted in the 1980s (Wang & Cheng, 2009). Since late 1990s, PPP in China reached a peak. The number of PPPs in roads, especially for expressways increased from 0 to 122 PPP contracts in roads (Mu, de Jong, & ten Heuv, Public-private partnerships for expressways in China: An Agency Theory Approach, 2008). With the rise of PPP in China, government published several regulations to encourage private investment in 2000s:

- Concession Regulations for Urban Infrastructure Projects in Beijing (Beijing Municipal Government, 2006)
- Some Suggestions (36 clauses) on Developing Private Economy (State Council, 2005)
- Decisions on Investment Modes Reform (SDRC, 2004)
- Regulations on Developing Public Utilities Using Concession for gas, water, heating, transportation, water/waste treatment, etc. (MOC, 2004)

Lessons Learned

Although the basic knowledge of PPP had been established in China and a rise of PPP had been shown from 1993 to 2007, PPP in China experienced a fall from 2007 to 2010. As per the figure 4, total investment in PPP projects in China decreased from 8351 USD million in 2006 to 2513 USD million in 2009, even in 2010, there is minimal investment in PPP projects.

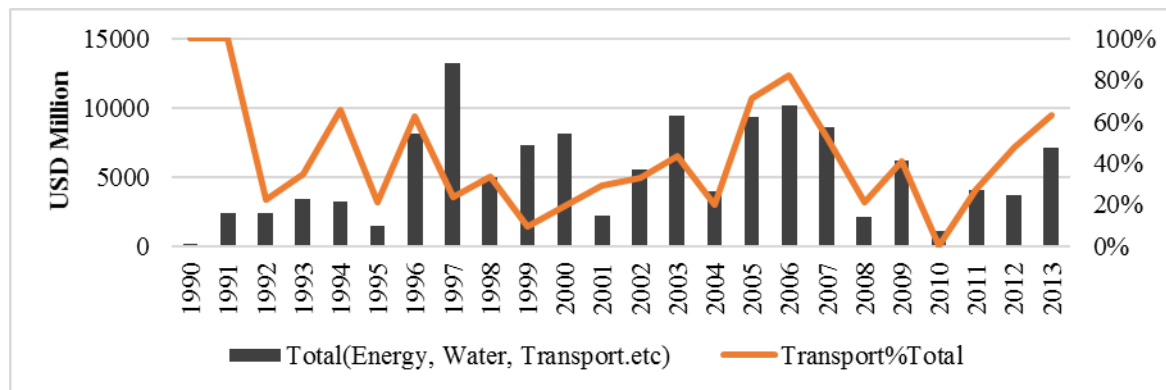


Figure 4: Total investment in PPP projects in China (USD million)

Source: World Bank, 2013

Indian government can learn some lessons from the rise and fall of PPP in China. Firstly, from 2007 to 2010, a large majority of new large transport contracts were granted to state-owned enterprises (SOEs). Using SOEs is the main shortcoming, which led to the fall of PPP. In addition, low productivity is another problem which results from overstaffing and need of many level task permissions from various authorities, especially in large road construction projects. Finally, most important lesson is lack of legislation and standardization. Although Chinese government published several regulations about PPP, standards and laws focusing on PPP in road construction should be clarified. Indian governments also need to implement Reward or Penalty policy based upon the performance of the involved partners in a PPP project.

V. CONCLUSION

General

PPPs are a necessity and not just an option looking at the growing India's infrastructure needs which puts India as the third largest in the world in the list of countries with GDP earned from PPP. However there are series of issues identified throughout a project flow under PPP model that need to be addressed and resolved in order to facilitate a better understanding on how to develop highway infrastructures efficiently and seamlessly via PPPs. The previous section has identified some of these constraints, issues and challenges requiring deep understanding. To answer these research questions we require inputs and insights from engineering, planning, management economics, political science and other disciplines of social science. With all the challenges faced by public as well as private sector simultaneously under a PPP road project as it deals with growing demand road development, there is a strong demand for trained professionals, particularly those with dedicated minds in the field of engineering, planning, economics and political sciences, to solve the issues identified above.

Concluding Remarks

The roads and highways form the nervous system of a country and play a key role in the economic growth of the country. The Government of India has taken various measures to upgrade the capacity and quality of the National Highways network. PPP routes have been adopted by the government to meet the funding gap and use techno-managerial efficiencies of the private sector to obviate the inefficiencies in the traditional public procurement system.

Various reforms have been introduced by the Government of India to create an enabling environment for participation of the private sector in the development of the road projects through the PPP route. MCAs have been developed to facilitate standardized industry framework of terms and conditions and ensure uniformity in the various contractual agreements for PPP road projects.

BOT (Toll) and BOT (Annuity) are the two PPP models that have been used in procuring the National Highways projects in India. The BOT (Toll) model is predominantly used for development of projects in stretches with high traffic density and financial viability. On the other hand, BOT (Annuity) is the more attractive PPP model for development of road projects in those stretches of the National Highway network with medium/low traffic density. Hence, the risk profile of the projects and financial viability of the project influences the selection of the type of PPP models. The critical issues, constraints, challenges and their causes for each of these models at their various stages of progression have been discussed.

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