



## CHALLENGES OF PUBLIC-PRIVATE PARTNERSHIP IN HIGHWAY PROJECTS IN INDIA

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**Abstract:** In developed and developing nations, the government has critical limitations in their capacity to make an interest in the arrangement of Public infrastructure. This has achieved the association of private area members in the arrangement of such administrations. In numerous nations, including India, executing framework advancement ventures have consistently been an issue because the activities are not generally finished, what's more, it brings about disappointment on government or the public segment. The goal of this current examination is to the difficulties in executing the Public-Private Partnership by looking at the components that ruin the effective appropriation of Public-Private Partnership in India. A survey was utilized to inspire the view of the general population and private segments concerning the limitations of Private Partnership execution in India. The discoveries of this examination may profit professionals to additionally improve Public-Private Partnership execution by disposing of or limiting the negative factors that obstruct the advantages of utilizing a Private Partnership. Moreover, understanding the view of both people in general and private segments is urgent because fruitful usage of Public-Private Partnership requires duty from the contracting parties.

**Index Terms - Public-Private partnership, highway, challenges, contracts**

### 1.1. INTRODUCTION

A public-private organization additionally called a PPP, P3, or 3P is a drawn-out agreeable understanding between a privately owned business and the national or neighborhood government. Public-private association plans have existed from the beginning of time, yet have become altogether increasingly well-known over the globe since the 1980s as governments endeavor to acquire a few advantages from the private division without making the full privatization bounce. In a PPP course of action, privately owned businesses complete parts of government work. As indicated by the World Bank Group, public-private organizations do not for the most part incorporate turnkey development or administration contracts – these are classed as public obtainment activities or privatization of utilities where the open area despite everything has a constrained continuous job.

Public-Private Partnership (PPP) was launched as a major vehicle to develop infrastructure in various sectors, including the roads and highways sector. Roads and highways sector also got the nod for accelerated development through re-orienting the National Highways Authority of India (NHAI) as a nodal agency to oversee road/highway development in India by adopting various PPP models (Nallathiga & Shah, 2014).

While the focus on infrastructure development is one of the main agenda of the Government, it has not been able to deliver it in a big way when compared to other Asian countries. Although the PPP models have been operational in India for quite some time, they have not been as successful as they were in other countries. For some time, the formation of roads and highways has only been waning as evident from a large number of road/highway projects remaining under 'underdevelopment' or 'to be awarded' category (PPP Cell, Ministry of Finance, 2012).

### 1.2. NEED

The greater part of the examinations done on PPP on Indian configurations has been centered around the issues of PPP in the Indian economy. India is a creating nation it should be developed by the method of the improved framework. We need solid restricting strategies for PPP and satisfy the hole among progress and disappointment in a wide range of ventures by the method of an arranged structure in PPP. Regularly, the relative achievement or disappointment of any task is connected to/estimated as far as undertaking expectations in a legally binding system, which includes the cost, time, and quality boundaries (Atkinson 1999). In this way, the achievement/disappointment of a task is connected to the gathering or not these legally binding boundaries.

### 1.3. AIM

Aim of this research is to identify the challenges of highway projects under Public Private Partnership contracts and suggest mitigation measures to manage the same.

### 1.4. OBJECTIVE

The objective of this study is to identify the most pertaining risk that occurs during the construction, substantiating through a case study of a highway project in India and suggest mitigation measures to manage the same.

## 2.1. REVIEW OF PPP MODELS

The Indian highway segment assumes a fundamental job in framework administrations and the advancement of the district. The Indian government has found a way to upgrade the state of national interstates. There are different PPP models utilized in the road part, however, most usually utilized are Build Operate Transfer (BOT) and Design-Build Finance Operate Transfer (DBFOT). To defeat difficulties looking in these model's legislatures of India propelled another PPP model in 2015 named Hybrid Annuity Model (HAM) and this model is broadly acknowledged by general society and private division. The models used in PPP projects differ by their risk-sharing and responsibility-taking consideration between both sectors (Bramhankar, 2018). The greater part of the roadway ventures granted under the National Democratic Alliance (NDA) government's new model has been stuck for the absence of subsidizing, as indicated by information audited by Hindustan Times, incompletely because the designers overextended themselves by offering for an excessive number of tasks and somewhat because banks are hesitant to advance them cash.

The activities depend on the purported Hybrid Annuity Model (HAM) that was presented by the Center in January 2016 to restore ventures that had been stuck during the past United Progressive Alliance (UPA) system for reasons running from absence of accounts and legal government endorsements to their powerlessness to finish the land securing. Numerous engineers at that point had to relinquish ventures.

## 2.2. PRIVATE SECTOR PARTICIPATION IN ROAD DEVELOPMENT

Roads were completely built with the government funds (of both Centre and State) by the government departments and agencies (of both Centre and State) for several decades. This arrangement gave limited results and was fraught with several operational and budgetary issues. The opening up of roads to the private sector began with highway development upon the establishment of NHAI. Although NHDP Phase I and II were publicly financed through fuel cess and federal grants and used traditional contracting model, NHDP Phase III to VII is undertaken in PPP mode. Grant financing model is replaced by the revenue model based on toll collections to finance the project. The private developers are provided good incentives by the Government of India for making road development an attractive option for them.

## 2.3. SUCCESS AND FAILURE FACTORS IN HIGHWAY

Road infrastructure projects, like other projects, have a project life cycle, during which project activities suffer from unsuccessful/successful completion, delays, and escalation, which are attributed to different factors operating at the project level. Therefore, various factors have been considered in different stages of PPP projects in the roads sector in India for further analysis of the project success/failure. The different project life cycle stages that are considered in our research study are:

- Planning stage
- Procurement stage
- Development stage
- Construction, operation and maintenance stage

## 2.4. MAJOR RISKS IN HIGHWAY PROJECTS

Table 1: Typical risks in PPP highway projects

RISK TYPE	DESCRIPTION
<b>Pre-operative task risks</b>	
Delays in land acquisition	Refers to the risk that the task site will be inaccessible or incapable to be utilized inside the necessary time, or in the way or the cost foreseen or the site will produce unexpected liabilities because of existing encumbrances and local cases being made on the site.
External linkages	This alludes to the risk that sufficient and opportune availability to the venture site isn't accessible, which may affect the initiation of development and the general pace of improvement of the task. Instances of the network for a port are street and rail joins.
Financing risks	Refers to the risk that adequate account won't be accessible for the venture at a sensible expense (e.g. due to changes in economic situations or credit accessibility) bringing about deferrals in the budgetary conclusion for an undertaking.
Planning risks	This alludes to the risk that the pre-advancement considers (specialized, lawful, budgetary, and others) directed are deficient or not vigorous enough bringing about potential deviations from the results that were arranged or expected in the PPP venture improvement.
<b>Construction phase risks</b>	
Design risk	This alludes to the risk that the proposed structure will be not able to meet the exhibition and administration prerequisites in the yield detail. It can bring about extra expenses for adjustment and update.
Construction risk	This alludes to the risk that the development of the advantages required for the task won't be finished on schedule, on a careful spending plan, or to particular. It might prompt extra crude materials and work costs, extra financing costs, an expansion at the expense of keeping up an existing framework, or giving an impermanent elective arrangement because of a postponement in the arrangement of the administration.
Approvals risk	This alludes to the risk that delays in endorsements to be gotten during the development stage will bring about a deferral in the development of the benefits according to the development plan. Such deferrals in getting endorsements may prompt cost invades.
Additional Site Risk	This alludes to the risk that the arranged site will be insufficient to take into account the assessed traffic at the port offices being created. All things considered, an extra site may be given by the port position to the concessionaire.
<b>Operation phase risks</b>	

Technology risk	This alludes to the risk that the innovation utilized in the plan of the port or the port administrations will surprisingly get outdated during the life of the PPP and won't have the option to fulfill the necessities in the yield determinations. It would bring about expanded expenses of substitution innovation.
Operations and maintenance risk	Refers to the risks related to the requirement for expanded support of the advantages over the term of the undertaking to meet execution necessities. In the Ports division, this can incorporate the danger of siltation, which would prompt higher working expenses for digging and the hazard that current common works will be found to require extra support.
Traffic risk	This alludes to the risk that interest for administration will differ from the underlying estimate, with the end goal that the complete income got from the undertaking over the venture life will fluctuate from starting desires. This volume-related income hazard is just for ventures which have duties from port activities as an income source. There is no danger of this sort in the board contracts, in which income is from a fixed expense or execution based installment.
Payment risk	This alludes to the risk that levies for port administrations are not gathered in full or are not set at a level that permits recuperation of expenses. This is a hazard for the private division in all ports ventures where income is from levies. The open area faces this hazard under administration contracts.
Financial risk	This alludes to the risk that the concessionaire presents a lot of money related weight on an undertaking by utilizing an unseemly monetary structure. It can bring about extra subsidizing costs for expanded edges or unexpected renegotiating costs.
<b>Handover risks</b>	
Handover risk / Terminal value risk	This alludes to the risk that the concessionaire will default in the handover of the benefit toward the finish of the task life, or that it will neglect to fulfill the base quality guideline or feasible estimation of the advantage that should be given back to the open element.
<b>Other risks</b>	
Change in law	This alludes to the risk that the current legitimate/administrative system will change, having a material antagonistic effect on the task.
Force Majeure	This alludes to the risk that occasions outside the ability to control of either substance may happen, bringing about a material unfavorable effect on either gathering's capacity to play out its commitments under the PPP contract. These occasions are in some cases likewise called "Demonstrations of God", to show that they are outside the ability to control either contracted gathering.

Sponsor risk	This alludes to the risk that the Sponsor will end up being an inadmissible accomplice for the undertaking, for instance, because of helpless venture the board or an inability to completely perceive the concurred terms of the Concession Agreement.
Concessionaire event of default	This refers to the risk that the concessionaire won't satisfy its legally binding commitments and that the legislature will be not able to either implement those commitments against the concessionaire or recuperate some type of payor cure from the concessionaire for any misfortune supported by it because of the break.
Government event of default	This refers to the risk that the administration won't satisfy its authoritative commitments and that the private substance will be not able to either authorize those commitments against the legislature or recoup some type of payor cure from the legislature for any misfortune continued by it because of the penetrate.

### 3.1. CASE STUDY

Project Name: Delhi Gurgaon expressway

Stakeholders

- Public institution: NHAI
- Private Institution: D. S.Consultant
- Government: Haryana state government and Delhi state government

State and year of the contract signed: Delhi and Haryana 2002

Cost: 1175 Crores

Concession period: 20 years

PPP structure: BOT (includes Design and Finance)

### 3.2. RISK AND CHALLENGES FACED

- Bids were gotten with negative awards.
- The venture improvement, in any case, before long ran into issues over endorsements, land securing, and augmentations to the extent of work which was to a great extent because of the physical setting of the undertaking expressway.
- There were more than 15 government organizations/municipal bodies, for example, the Delhi Jal Board, the Ministry of Defense, GAIL, BPCL, Delhi Development Authority (DDA), Haryana Urban Development Authority (HUDA), GoH, GoNCTD, Haryana Tourism, Airports Authority of India (AAI), and so on were influenced by the improvement of this expressway that needed to allow different endorsements for the venture. This turned into a complex and tedious procedure during the development time frame, subsequently causing the deferral.
- Also, legal disputes, evacuation of trees, moving of strict structures, and the huge number of utilities that must be moved added to the deferral.
- Another significant purpose behind the postponement in venture fruition was the adjustment in the extent of work. There were considerable changes in the first structure that were looked for by NHAI and the administration remembering future necessities and the accommodation of workers. Out of a sum of 11 structures, spread over the whole venture length, 9 structures had noteworthy plan alterations.
- With the high thickness of traffic on the course and the necessity of a base length for speeding up and de-quickening of traffic being around 300 meters (according to the Indian Roads Congress Provisions), the incomplete opening of interstate must be kept down for security reasons regardless of whether finished at specific areas.

#### 4.1. SURVEY AND RISK ANALYSIS

The sort risks validated by the contextual investigation of the Delhi-Gurgaon expressway were additionally partitioned into various classifications for a review and expert opinion.

The different risks were distinguished and ordered and dependent on that a survey was set up on a "5-point Likert scale", where guide 1 toward point 5 shifts from exceptionally generally safe to high risk separately. Further, this information was assembled and examined utilizing the Relative Importance Index (RII) strategy. The dissected risks were positioned by their significance of antagonistic effects on the highway development venture.

- The relative importance index (RII) for the risk priority is calculated based on all responses for each risk.
- The priority of each risk is given by the relative importance index (RII) value which is according to the adverse impact of each risk.
- The risks are prioritizing according to their ranks. The priority helps to identify the most significant risks.

$$RII = \sum W / A * N$$

W – is the weight given to each risk by the respondents and ranges from 1 to 5, (where “1” is “very low risk” and “5” is “very high risk”)

A – is the highest weight (i.e. 5 in this case) and;

N – is the total number of respondents.

The various risks categorized under different categories were calculated and ranked. The higher value of RII represents significant risks affecting the construction of the highway project.

#### 4.2. RESULTS

Table 2: Survey results of all respondents both associated and non-associated with highway projects

TYPES OF RISK CATEGORY	SUB-DIVISION OF RISKS		ΣW	A*N	RII	RANK
Financial risks	Lack of finance		124	160	0.775	1
	Delay in cashflow		114	160	0.7125	7
	High cost		104	160	0.65	16
	Inability to pay the debt		120	160	0.75	3
Design risk	Design errors and omissions		92	160	0.575	20
	Design change		112	160	0.7	9
	Scope change		106	160	0.6625	14
	Consideration of improper basic parameters		98	160	0.6125	18
	Uncertain indirect costs: design, construction, project management		110	160	0.6875	11
Land acquisition	Change in policies		108	160	0.675	12
	Uncertain land acquisition cost		118	160	0.7375	4
	Uncertain land acquisition schedule		92	160	0.575	20
Environmental risks	Natural obstruction		90	160	0.5625	22
	EIA Required		84	160	0.525	23
	Dislocation of residents		121	160	0.75625	2
	Force majeure		75	160	0.46875	25
Construction risks	Lack of machinery		84	160	0.525	23
	Lack of skilled labor		99	160	0.61875	17
	Concessionaire issues		113	160	0.70625	8
	Traffic congestion		116	160	0.725	5

	<b>Time factor</b>		111	160	0.69375	<b>10</b>
	Uncertain construction market conditions		105	160	0.65625	15
Political risks	Issues related to obtaining Railway Permits		96	160	0.6	19
	<b>Issues related to obtaining Govt. Permits</b>		115	160	0.71875	<b>6</b>
	Other Political or external issues		107	160	0.66875	13

Table 3: Survey result of only associated respondents

TYPES OF RISK CATEGORY	SUB-DIVISION OF RISKS		$\Sigma W$	A*N	RII	Rank
Financial risks	<b>Lack of finance</b>		57	75	0.76	<b>1</b>
	<b>Delay in cashflow</b>		52	75	0.693333	<b>10</b>
	High cost		46	75	0.613333	15
	<b>Inability to pay the debt</b>		56	75	0.746667	<b>4</b>
Design risk	Design errors and omissions		41	75	0.546667	21
	<b>Design change</b>		57	75	0.76	<b>1</b>
	<b>Scope change</b>		55	75	0.733333	<b>5</b>
	Consideration of improper basic parameters		39	75	0.52	22
	Uncertain indirect costs: design, construction, project management		51	75	0.68	12
Land acquisition	Change in policies		51	75	0.68	12
	<b>Uncertain land acquisition cost</b>		53	75	0.706667	<b>8</b>
	Uncertain land acquisition schedule		43	75	0.573333	18
Environmental risks	Natural obstruction		42	75	0.56	19
	EIA Required		42	75	0.56	19
	<b>Dislocation of residents</b>		57	75	0.76	<b>1</b>
	Force majeure		34	75	0.453333	25
Construction risks	Lack of machinery		37	75	0.493333	24
	Lack of skilled labor		44	75	0.586667	17
	Concessionaire issues		51	75	0.68	12
	<b>Traffic congestion</b>		53	75	0.706667	<b>8</b>
	<b>Time factor</b>		54	75	0.72	<b>7</b>
	Uncertain construction market conditions		46	75	0.613333	15
Political risks	Issues related to obtaining Railway Permits		39	75	0.52	22
	<b>Issues related to obtaining Govt. Permits</b>		52	75	0.693333	<b>10</b>
	<b>Other Political or external issues</b>		55	75	0.733333	<b>5</b>


### 4.3. Conclusion

According to the survey conducted (for respondents whether or not associated with any highway construction presently or previously), lack of finance, delay in cash flow, and inability to pay debts are some financial issues that are most pertinent. Design changes in that category of design risk, uncertain land acquisition cost, dislocation of residents, concessionaire issues, traffic congestion, delay in construction, and issues related to government permits are most faced challenges. However, analyzing the responses of the respondents who have been associated with the highway construction, lack of finance, delay in cashflow, and inability to pay debts, design change, scope change, uncertain land acquisition cost, dislocation of residents, traffic congestion, delay in construction and issues related to government permits and other political issues are some pertinent challenges faced.

The findings of the present study not only add to the limited knowledge in this field as PPP implementation is continuously progressing in India but, to some extent, also contribute to practice. In particular, understanding the constraints of negative factors for successful PPP adoption allows relevant parties, either the Government or the private sector providers, to take the necessary measures as an effort in overcoming the identified constraints to ensure maximum benefit is achieved from the PPP projects. In particular, the findings on the lack of government guidelines on PPP procedures provide a signal to the PPP regulatory body concerning the need to immediately overcome the issue. This is mainly because PPP implementation is still new and progressing in India, so the need for clear guidelines and procedures on PPP is considered important by the key players in the industry. Meanwhile, continuous economic development also requires the public sector to enhance the practice of PPP in India to ensure that the needs of the public can be met according to the required standard at the best cost to the public sector. Therefore, the Government needs to set a win-win situation with the private sector provider without burdening the public as the end-user of the facilities provided.

Results are more or less the same in both considerations.

### 4.4. Mitigation Measures

<p>Lack of finance</p> 	<ul style="list-style-type: none"> <li>• A thorough and detailed risk analysis should be done that should cover payment clauses, stage and milestone related payments, cost escalation, and cash flow of the project.</li> <li>• Assess the financial strength, working capital levels, contractors' organization market liability, select the contractor based on the contract performance record, rather than L1 selection in the Prebid stage itself.</li> <li>• To adopt market price-based escalation formulae than indices based, to prevent a mismatch between price rise and escalation compensation.</li> <li>• To adopt project-based funding mechanism,</li> <li>• Access and periodically review of contractor's financial reports and performance reports.</li> <li>• To develop an effective financial model.</li> </ul>
<p>Construction risk</p>	<ul style="list-style-type: none"> <li>• Revise the Model Concessionaire agreement.</li> <li>• The proper study of traffic projection for the profitability of the project is based on the traffic study of State Highway. The projected calculation is required to service the debt repayment and interest repayment.</li> <li>• Delay in construction due to any of the reasons, whether direct or indirect, will lead to cost escalation.</li> </ul>
<p>Design risk</p>	<ul style="list-style-type: none"> <li>• Ensure the contract clauses define mechanism related to price for extra work, time extension eligibility, and limit of extra work.</li> <li>• Also, the procedure for evaluation of rates for Extra work and substituted items should be defined</li> </ul>
<p>Land acquisition and relocation of residents</p>	<ul style="list-style-type: none"> <li>• Receive permits before the commencement of the project and not side by side or later on.</li> <li>• LARR Act mandates prior consent by at least 70% of landowners for PPP projects, however, there are still issues in acquiring land.</li> <li>• Introduction of clause mentioning the time limit for such activities to ensure no delay.</li> </ul>



Political risk	<ul style="list-style-type: none"> <li>Current MCA does not hold accountable to the concessionaire for government permit, yet delay in any manner will lead to concessionaire paying 0.01% to NHAI as weekly damage due to delay.</li> </ul>
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