

**DEVELOPMENT OF A FRAMEWORK FOR SMOOTH  
AND RAPID EXECUTION OF PPP ROAD PROJECTS**

**AJIT KUMAR SINHA**



**DEPARTMENT OF CIVIL ENGINEERING  
INDIAN INSTITUTE OF TECHNOLOGY DELHI  
OCTOBER 2019**

© Indian Institute of Technology Delhi (IITD), New Delhi, 2019

**DEVELOPMENT OF A FRAMEWORK FOR SMOOTH  
AND RAPID EXECUTION OF PPP ROAD PROJECTS**

by

**AJIT KUMAR SINHA**  
**Department of Civil Engineering**

*Submitted*

*In fulfillment of the requirements of the degree of Doctor of Philosophy*

to the



**INDIAN INSTITUTE OF TECHNOLOGY DELHI**

**OCTOBER 2019**

## CERTIFICATE

---

This is to certify that the thesis entitled “**Development of a framework for smooth and rapid execution of PPP road projects**”, being submitted by **Mr.Ajit Kumar Sinha** to the Indian Institute of Technology Delhi for the award of the degree of **Doctor of Philosophy** is a bonafide record of the research work carried out by him under my supervision and guidance. The thesis work, in my opinion, has reached the requisite standard, fulfilling the requirements for the degree of Doctor of Philosophy.

The contents of this thesis, in full or in parts, have not been submitted to any other University or Institute for the award of any degree or diploma.

**Prof. Kumar Neeraj Jha**  
Department of Civil Engineering  
Indian Institute of Technology Delhi  
New Delhi 110016  
India

## ACKNOWLEDGEMENTS

---

My respectful thanks to the ALMIGHTY, my late mother and father for their eternal blessings and providing me with an unyielding determination that saw me negotiate through the long intellectual journey culminating in completion of the research work.

My heartfelt regards and gratitude to Prof. Kumar Neeraj Jha, my supervisor, who extended relentless and undiluted guidance throughout the study, specially when the going was tough. One hardly comes across such human beings these days, when even values are at a premium. Discussions and travelling with him for academic purposes used to be an educative treat and memories shall always be cherished longingly and wistfully. An insight into his varied experiences went as cardinal inputs into the research work. In short, his guidance was “vast, varied and versatile”.

I am sincerely grateful to Prof. Geetam Tiwari, TRIPP, IIT, Delhi, Prof. Ravi Shankar, Department of Management Studies, IIT, Delhi and Prof. K. C. Iyer, Civil Engineering Department, IIT, Delhi for their intellectual nuggets provided, for improving the research work. Prof. Tiwari’s assistance in obtaining input data from various organisations was very crucial, for which I shall ever remain grateful.

I am indebted to officers from the National Highway Authority of India (NHAI), Sh. Sharath Kumar Pallerla, Scientist, Dr. Sudheer Chintalapati, Joint Director (S), Ministry of Environment Forest and Climate Change, Sh. Dinesh Kumar, DDG, Ministry of Statistics and Programme Implementation for extending full co-operation in providing

inputs and data. Thanks are also due to Ajoy (IDBI, Mumbai), M. Sridhar (Nagarjuna Constructions), K. Hariharan, Consultant for interactions and helping in data collection.

My thanks to Justice (retd.) C.K. Prasad, Chairman Press Council of India, Shri Rajeev Baijal, formerly GM (Civil), NTPC, New Delhi, Shri K. Bhattacharjee, formerly Executive Director, Ministry of Civil Aviation, New Delhi, Ms. RevathyRaghavan and Shri Chandwani, both practicing advocates, for the interviews and interactions.

Thanks are also due to Shri J. Bhagat, CE, CCW: AIR, New Delhi, Shri M.S. Ansari, ADG (E), DG: AIR, New Delhi for constant encouraging words. My gratitude to Shri A.K. Gupta SE(C), Shri S. Mandal, SW(C) both with CCW: AIR, New Delhi for their technical inputs. Dr. Devinder Singh, who provided unstinted support in overseeing my thesis proof, gratitude to him. My gratitude to Ms. Anita Sharma, PA, Shri Dharminder and Shri Anil, PAs and Shri Deepak, working with the CCW: AIR, New Delhi for providing support in typing works. My exclusive thanks to Shri Lajpat Rai, Draftsman, CCW: AIR, New Delhi for assisting in preparation of figures and flow charts through AutoCAD.

A big sense of gratefulness to Abhilasha Panwar, co-researcher for her constant and unfiltered support in uploading journal papers, proof reading and encouragements. My thanks to the co-researchers Prachi, Amit Sharma, Sparsh Johari, Santu Kar for extending help and providing time off his very tight schedule, Fikreyesus, Rouzbeh, Harsh for proving to be panacea whenever the chips were down and to Sathish for supporting in late night sittings required for refining the typed works. Gratitude to Satish Kumar V, co-researcher for preparation and several revisions of the final work, and in

wriggling out from many research related sticky situations. Sincere thanks to Rutuja and Pooja for their kind cooperation extended for graphical representation of the data. Thanks to Randhir Kumar Jha for helping out in taking prints and others multifarious works. Thanks are also due to the experts who took time off their schedule to participate in discussions.

Last but not the least, I am indebted to my sister Mamta, and brothers Deepak and Nishit for putting up with my prolonged absence that prevented me from making any contribution during this period on domestic front.

Over and above it was such an enriching and intellectual urge-satisfying experience that given an option I would like to work again, of course, with Prof. Jha as Supervisor.

**AJIT KUMAR SINHA**

## ABSTRACT

---

Economic growth of a nation is integrally linked to the availability and standard of various infrastructure. Transport infrastructure comprising the four sub-sectors of roads, railways, airports and ports and their related peripheral infrastructure play a role of a crucial contributor in achieving and sustaining growth. Carriage of freight and passengers are solely dependent on availability of commensurate infrastructure.

Till the start of 1990s, building infrastructure was carried out through the traditional route of contracting out the works and fully funded by the government of the day. With the opening of the Indian economy in 1991, the approach towards execution of such projects underwent a paradigm shift. The concept of private participation in construction of roads, airports, ports, and railways started gaining momentum. Commensurate amendments in existing laws and acts responsible for taking up these projects, were effected for accelerating the process. It all started with amendments to the National Highway Act, 1956, vide which rights for collection of tolls and user fees were conferred to private players. Public Private Partnership (PPP) projects and its variants were introduced during the second half of the last decade of the 20<sup>th</sup> century, in India. The PPP mode of investment and execution of projects got a big push with the approval for strengthening and widening of the roads and highways in 1998. Subsequently, concession agreements started getting evolved and standardised, incorporating lessons and shortcomings encountered in the immediate past. The provisions that existed in the financial sector that governed the banks and lenders were subject to refinement and updating as per requirement. New institutions and legal measures were introduced. Various government schemes (enablers) were started and related rules were notified for seeing and attracting private investment into the infrastructure sector.

With the PPP route getting evolved with the passage of time, it was experienced that the expected rapid growth in PPP penetration in the road sector was not keeping pace with the demand. It further emerged from various studies that still, a lot many impeding Focus area, such as delay in grant of land acquisition, obtaining various approvals, were impeding smooth execution of these projects. Many of these projects had to face arbitration and litigation thereby the investments getting locked and in turn leading to numerous problems related to financing of such projects. Therefore, the present research aimed at identifying roadblocks that impeded the smooth execution of projects. Following such identification, the gaps in rules and regulations were identified where requirement of either fresh rule provisions or amendments or refinements to counter these impeding Focus area was felt. This set out the objectives for the present study which comprised identification of enabler and barrier attributes (e and b attributes) as first objective. The second objective of the study comprised analysis of time and cost overruns incurred by PPP road projects. The third objective entailing intensive study of all the related laws, rules, regulatory provisions, and Acts governing PPP road projects. This was required to identify the gaps in the rules/ laws in order to amend refine and make these rules/ laws more comprehensive to facilitate negotiating the b-attributes. Lastly, the fourth objective comprised development of a framework dealing all aspects of PPP road projects. The sequential stages have been delineated in great detail to be followed for ensuring time bound completion of PPP road projects.

The study involved extensive review of existing literature followed by a pilot survey to come out with a tentative list of e and b-attributes. Experts' views and opinions were sought to reinforce and firm up the list of such attributes. It emerged from the above adopted method that four areas viz related to issues in aspects of land acquisition, environmental clearance, project financing and arbitration, disputes, and litigations, formed the major concerns. A list of ongoing and completed projects along with input

data were obtained from the public authority. Similarly, inputs in regard to project that suffered time and cost overrun were also obtained. These data were put to in-depth analysis that comprised descriptive statistical analysis and regression analysis for identifying reasons behind projects incurring time and cost overruns. Subsequently, the related laws, rules, statutes and acts were studied for identifying gaps in them to amend or refine these provisions. The refinement and amendments to rules had been proposed with a view to negotiating the barrier attributes for reducing their adverse effects.

The research findings and results identified 52 enabler attributes (e–attributes) and 22 barrier attributes (b – attributes) and their categorisation into respective focus area such as F1 (land acquisition, rehabilitation, and resettlement issues in PPP road projects), F2 (environmental, forest, and wildlife clearances including environment impact assessment), F3 (project financing), and F4 (aspects of arbitration, disputes, and litigation). The results were validated through case studies and structured interviews with professionals having vast experience of 30 or more years behind them.

The results from the research show that 48 BOT toll and 16 BOT annuity ongoing projects have suffered an average time overrun of 52 and 62.17 months respectively. Similarly, 29 toll and 12 annuity completed projects have suffered an average time overrun of 25.93 and 22.91 months respectively. On analysis of cost overruns incurred by the completed projects, it emerges that one project has suffered cost overrun of 114.56% of the awarded project cost. The six projects chosen for the analysis of cost overrun have suffered an average of 58.36% of the awarded project. Outcome of the other findings give sufficient evidence to the effect that with the introduction of new land acquisition Act in December 2013 and the online procedure adopted for streamlining grant of environmental clearance (EC) and tracking of EC has resulted in substantial reduction in time taken for according approvals. Till 2014, the time taken for the grant of EC was 500-600 days on an average, which has now come down to 120 days on an average.

The above findings were validated by way of case studies. This method of validating findings is an often used, versatile and acceptable method.

Based on the findings, this research has developed a framework for ensuring that any PPP road project is executed in a smooth and time bound manner. The framework enumerates all the stages, project conception downwards, adhering to which is a 'must'. The successive steps include pre-feasibility study, detailed project report including rehabilitation and resettlement, need for and justification of the need for the project. The stages further entail all aspects related to traffic study and demand including working out expected growth of traffic and affordability of user fees. Further, the legal, environmental and financing of projects have also been factored in, in the framework. One important recommendation emerging from the study is the introduction of a 'single window system' for conducting simultaneous public hearings required in cases of for both, land acquisition and grant of EC. These steps will certainly facilitate the rapid progress of PPP road projects.

**Keywords:** Public private partnership, Environmental clearance, Time overrun, Case study, Framework, Built-operate-transfer

## सार

---

एक राष्ट्र की आर्थिक वृद्धि एकीकृत रूप से विभिन्न बुनियादी ढांचे की उपलब्धता और मानक से जुड़ी हुई है। परिवहन अवसंरचना में सड़क, रेलवे, हवाई अड्डे और बंदरगाह के चार उप-क्षेत्र शामिल हैं और उनके संबंधित परिधीय बुनियादी ढांचे विकास को प्राप्त करने और बनाए रखने में महत्वपूर्ण योगदानकर्ता की भूमिका निभाते हैं। माल ढुलाई और यात्रियों का आवागमन पूरी तरह से कम्यूनिकेशन इन्फ्रास्ट्रक्चर की उपलब्धता पर निर्भर है। 1990 के दशक की शुरुआत तक, बिल्डिंग इन्फ्रास्ट्रक्चर को काम के अनुबंध के पारंपरिक मार्ग के माध्यम से किया गया था और दिन की सरकार द्वारा पूरी तरह से वित्त पोषित किया गया था। 1991 में भारतीय अर्थव्यवस्था के खुलने के साथ, इस तरह की परियोजनाओं के निष्पादन के प्रति दृष्टिकोण एक बदलाव से गुजर गया। सड़कों, हवाई अड्डों, बंदरगाहों और रेलवे के निर्माण में निजी भागीदारी की अवधारणा गति प्राप्त करने लगी। मौजूदा कानूनों में संशोधन और इन परियोजनाओं को लेने के लिए जिम्मेदार कृत्यों, प्रक्रिया में तेजी लाने के लिए प्रभावित हुए थे। यह सब राष्ट्रीय राजमार्ग अधिनियम, 1956 में संशोधन के साथ शुरू हुआ, जिसमें टोल और उपयोगकर्ता शुल्क के संग्रह के अधिकार निजी खिलाड़ियों को दिए गए थे। पब्लिक प्राइवेट पार्टनरशिप (PPP) प्रोजेक्ट्स और इसके वेरिएंट 20 वीं सदी के आखिरी दशक की दूसरी छमाही के दौरान भारत में पेश किए गए थे। 1998 में सड़कों और राजमार्गों के सुदृढीकरण और चौड़ीकरण की मंजूरी के साथ परियोजनाओं के निवेश और निष्पादन के पीपीपी मोड को एक बड़ा धक्का मिला। इसके बाद, रियायत समझौते विकसित और मानकीकृत होने लगे, जिसमें सबक और अतीत में सामने आई कमियों को शामिल किया गया। वित्तीय क्षेत्र में जो प्रावधान बैंकों और उधारदाताओं को नियंत्रित करते थे, वे आवश्यकता के अनुसार शोधन और अद्यतन के अधीन थे। नए संस्थान और कानूनी उपाय पेश किए गए। विभिन्न सरकारी योजनाओं (enablers) को शुरू किया गया था और बुनियादी ढांचे के क्षेत्र में निजी निवेश को देखने और आकर्षित करने के लिए संबंधित नियमों को अधिसूचित किया गया था।

पीपीपी मार्ग समय के बीतने के साथ विकसित होता गया, यह अनुभव किया गया कि सड़क क्षेत्र में पीपीपी पैठ में अपेक्षित तेजी से वृद्धि की मांग में तेजी नहीं आ रही है। यह आगे कई अध्ययनों से सामने आया है कि अभी भी, बहुत सारे अवक्षेपण फोकस क्षेत्र, जैसे भूमि अधिग्रहण के अनुदान में देरी, विभिन्न अनुमोदन प्राप्त करना, इन परियोजनाओं के सुचारु निष्पादन को बाधित कर रहे थे। इनमें से कई परियोजनाओं को मध्यस्थता और मुकदमेबाजी का सामना करना पड़ा जिससे निवेश बंद हो गया और बदले में ऐसी परियोजनाओं के वित्तपोषण से संबंधित कई समस्याओं का सामना करना पड़ा। इसलिए, वर्तमान अनुसंधान का उद्देश्य उन बाधाओं की पहचान करना है जो परियोजनाओं के सुचारु क्रियान्वयन में बाधा डालती हैं। इस तरह की पहचान के बाद, नियमों और विनियमों के अंतराल की पहचान की गई जहां इन आसन्न फोकस क्षेत्र का मुकाबला करने के लिए नए नियम प्रावधानों या संशोधनों या शोधन की आवश्यकता महसूस की गई। यह वर्तमान अध्ययन के उद्देश्यों को निर्धारित करता है जिसमें पहले उद्देश्य के रूप में एनबलर और बैरियर विशेषताओं (ई और बी विशेषताओं) की पहचान शामिल थी। अध्ययन के दूसरे उद्देश्य में पीपीपी सड़क परियोजनाओं द्वारा किए गए समय और लागत की अधिकता का विश्लेषण शामिल था। तीसरा उद्देश्य सभी संबंधित कानूनों, नियमों, नियामक प्रावधानों और पीपीपी सड़क परियोजनाओं को नियंत्रित करने वाले अधिनियमों का गहन अध्ययन है। रिफाइन में संशोधन करने के लिए नियमों / कानूनों में अंतराल की पहचान करने और इन नियमों / कानूनों को अधिक व्यापक बनाने के लिए बी-विशेषताओं को सुविधाजनक बनाने की आवश्यकता थी। अंत में, चौथे उद्देश्य में पीपीपी सड़क परियोजनाओं के सभी पहलुओं से निपटने वाले ढांचे का विकास शामिल था। पीपीपी सड़क परियोजनाओं के समयबद्ध समापन को सुनिश्चित करने के लिए अनुक्रमिक चरणों को बहुत विस्तार से चित्रित किया गया है।

अध्ययन में मौजूदा साहित्य की व्यापक समीक्षा शामिल थी, जिसके बाद ई और बी-विशेषताओं की एक अस्थायी सूची के साथ एक पायलट सर्वेक्षण सामने आया। ऐसी विशेषताओं की सूची को सुदृढ़ और सुदृढ़ करने के लिए विशेषज्ञों के विचार और राय मांगी गई थी। यह उपर्युक्त विधि से उभरा है कि भूमि अधिग्रहण, पर्यावरण मंजूरी, परियोजना वित्तपोषण और मध्यस्थता,

विवादों और मुकदमों के पहलुओं से संबंधित चार क्षेत्रों ने प्रमुख चिंताओं का गठन किया। इनपुट और डेटा के साथ चल रही परियोजनाओं की सूची सार्वजनिक प्राधिकरण से प्राप्त की गई थी। इसी तरह, परियोजना के संबंध में इनपुट जिन्हें समय और लागत से अधिक का सामना करना पड़ा, को भी प्राप्त किया गया। इन आंकड़ों को गहराई से विश्लेषण में लगाया गया था जिसमें समय और लागत उगाने वाली परियोजनाओं के पीछे कारणों की पहचान करने के लिए वर्णनात्मक सांख्यिकीय विश्लेषण और प्रतिगमन विश्लेषण शामिल था। इसके बाद, इन प्रावधानों में संशोधन या परिशोधन के लिए उनमें अंतराल की पहचान के लिए संबंधित कानूनों, नियमों, विधियों और कृत्यों का अध्ययन किया गया। नियमों के शोधन और संशोधन को उनके प्रतिकूल प्रभावों को कम करने के लिए बाधा विशेषताओं पर बातचीत करने के उद्देश्य से प्रस्तावित किया गया था।

अनुसंधान के निष्कर्षों और परिणामों ने 52 एनबलर विशेषताओं (ई-विशेषताओं) और 22 बैरियर विशेषताओं (बी - विशेषताओं) की पहचान की और एफ 1 (भूमि अधिग्रहण, पुनर्वास, और पीपीपी सड़क परियोजनाओं में पुनर्वास के मुद्दों) जैसे संबंधित फोकस क्षेत्र में उनका वर्गीकरण, F2 पर्यावरण, वन और वन्यजीवों की मंजूरी सहित पर्यावरण प्रभाव मूल्यांकन), F3 (परियोजना वित्तपोषण), और F4 (मध्यस्थता, विवाद और मुकदमेबाजी के पहलू)। परिणामों को केस स्टडी के माध्यम से मान्य किया गया था और पेशेवरों के साथ संरचित साक्षात्कार थे जिनके पास 30 या उससे अधिक वर्षों का विशाल अनुभव था।

शोध के परिणाम बताते हैं कि 48 बीओटी टोल और 16 बीओटी वार्षिकी चल रही परियोजनाओं को क्रमशः 52 और 62.17 महीनों के औसत समय का सामना करना पड़ा है। इसी तरह, 29 टोल और 12 वार्षिकी पूर्ण की गई परियोजनाओं को क्रमशः 25.93 और 22.91 महीने का औसत समय मिला है। पूर्ण की गई परियोजनाओं द्वारा किए गए लागत से अधिक के विश्लेषण पर, यह उभर कर आता है कि एक परियोजना को परियोजना लागत से 114.56% अधिक लागत का सामना करना पड़ा है। लागत से अधिक के विश्लेषण के लिए चुनी गई छह परियोजनाओं को सम्मानित परियोजना का औसत 58.36% भुगतान पड़ा है। अन्य निष्कर्षों

के बाहर इस आशय के पर्याप्त सबूत हैं कि दिसंबर 2013 में नए भूमि अधिग्रहण अधिनियम की शुरुआत के साथ और पर्यावरणीय मंजूरी (ईसी) के अनुदान को सुव्यवस्थित करने और ईसी की ट्रेकिंग के लिए अपनाई गई ऑनलाइन प्रक्रिया के परिणामस्वरूप समय में काफी कमी आई है। अनुमोदन के अनुसार। 2014 तक, ईसी के अनुदान के लिए लिया जाने वाला समय औसतन 500-600 दिनों का था, जो अब औसतन घटकर 120 दिन हो गया है।

उपरोक्त निष्कर्षों को केस स्टडी के माध्यम से मान्य किया गया था। निष्कर्षों को मान्य करने का यह तरीका अक्सर इस्तेमाल किया जाने वाला, बहुमुखी और स्वीकार्य तरीका है।

निष्कर्षों के आधार पर, इस शोध ने यह सुनिश्चित करने के लिए एक रूपरेखा विकसित की है कि किसी भी पीपीपी सड़क परियोजना को सहज और समयबद्ध तरीके से निष्पादित किया जाता है। यह ढांचा सभी चरणों, परियोजना गर्भाधान को नीचे की ओर ले जाता है, जिसका पालन एक 'होना चाहिए' है। क्रमिक चरणों में पूर्व-व्यवहार्यता अध्ययन, पुनर्वास और पुनर्वास के लिए विस्तृत परियोजना रिपोर्ट, परियोजना की आवश्यकता के औचित्य और औचित्य शामिल हैं। ट्रेफिक अध्ययन और मांग से संबंधित सभी पहलुओं को आगे बढ़ाता है, जिसमें ट्रेफिक की अपेक्षित वृद्धि और उपयोगकर्ता शुल्क की वहन क्षमता शामिल है। इसके अलावा, परियोजनाओं के कानूनी, पर्यावरणीय और वित्त पोषण को भी रूपरेखा में शामिल किया गया है। अध्ययन से उभरने वाली एक महत्वपूर्ण सिफारिश दोनों के लिए, भूमि अधिग्रहण और ईसी के अनुदान के मामलों में आवश्यक सार्वजनिक सुनवाई के संचालन के लिए एक 'सिंगल विंडो सिस्टम' की शुरुआत है। इन कदमों से निश्चित रूप से पीपीपी सड़क परियोजनाओं की तीव्र प्रगति होगी।

कीवर्ड: पब्लिक प्राइवेट पार्टनरशिप, एनवायरनमेंटल क्लीयरेंस, टाइम ओवररन, केस स्टडी, फ्रेमवर्क, बिल्ट-ऑपरेट-ट्रांसफर

## TABLE OF CONTENT

CERTIFICATE.....	i
ACKNOWLEDGEMENTS.....	ii
ABSTRACT.....	v
सार.....	ix
TABLE OF CONTENT.....	xiii
LIST OF FIGURES.....	xx
LIST OF TABLES.....	xxi
LIST OF ABBREVIATIONS.....	xxiii
CHAPTER 1 INTRODUCTION.....	1
1.1 Background.....	1
1.2 Motivation for the Study.....	5
1.3 Aim and Objectives of the Study.....	6
1.4 Scope and Limitation.....	8
1.5 Organisation of the Thesis.....	9
1.6 Summary.....	11
CHAPTER 2 LITERATURE REVIEW.....	12
2.1 Introduction.....	12
2.2 Understanding Infrastructure.....	12
2.3 Aspects of Public Partnership Projects.....	14
2.3.1 PPP concession agreement.....	16
2.3.2 PPP laws and policies in India and worldwide.....	17
2.4 Barriers and Enablers and their Bearing on Projects.....	18
2.5 Land Acquisition Issues.....	19
2.5.1 Compensation for acquired land.....	20
2.5.2 Land acquisition process under the land acquisition Act (1894).....	21
2.5.3 Features and scope of the new Act (RFCTLARR - 2013).....	23
2.5.4 Land profile in states.....	25
2.5.5 Land acquisition Act 1894 and national highway Act 1956.....	27
2.5.6 Role of NHAI– land acquisition.....	28

2.5.7	Removal of bottlenecks.....	29
2.5.8	Other issues in land acquisition .....	30
2.5.9	Issues leading to conflicts in land acquisition.....	31
2.6	Aspects of Environmental and Other Clearances.....	32
2.6.1	Public consultation process.....	33
2.6.2	EIA as a regulatory tool .....	33
2.6.3	Important legislations regulating the environmental clearance in India .....	35
2.7	Financing of PPP Projects .....	37
2.7.1	PPP finance .....	38
2.7.2	Aggressive bidding .....	39
2.8	Dispute Resolution and Litigation.....	40
2.8.1	Understanding disputes.....	40
2.8.2	Causes fostering disputes and litigation in India .....	42
2.8.3	Successive stages in dispute resolutions .....	43
2.9	Advantages to PPP Projects .....	44
2.10	Research Gaps .....	44
2.11	Summary.....	45
CHAPTER 3 RESEARCH METHODOLOGY .....		48
3.1	Background .....	48
3.2	Methods and Methodology: A General Explanation of Various Terms .....	48
3.2.1	Research philosophy .....	49
3.2.2	Research approaches.....	50
3.2.3	Research strategy .....	51
3.2.4	Research method.....	51
3.3	Objective-Wise Research Methodology.....	55
3.3.1	Research method for objective 1.....	55
3.3.2	Research method for objective 2.....	59
3.3.3	Research method for objective 3.....	60
3.3.4	Research method for objective 4.....	61
3.4	Identification of Enabler and Barrier Attributes .....	62
3.5	Summary .....	70

CHAPTER 4	LAND ACQUISITION .....	71
4.1	Introduction .....	71
4.2	Background .....	74
4.3	Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act (RFCTLARR-2013).....	74
4.4	Institutional Structure .....	76
4.5	Impact of Environmental Clearance on Land Acquisition.....	77
4.6	Issues in Land Acquisition in India.....	79
4.6.1	Initiative by states for streamlining land acquisition and environmental clearance .....	79
4.6.2	Constraints to land acquisition in Indian state .....	79
4.7	Focused Group Questionnaire for Land Acquisition .....	81
4.7.1	Analysis of responses.....	82
4.8	Discussion .....	82
4.9	Concluding Remarks .....	84
CHAPTER 5	ENVIRONMENTAL CLEARANCE .....	86
5.1	Introduction .....	86
5.2	Legal Framework and Constitutional Provisions .....	88
5.3	Evolution of Environmental Rules and Regulations in India.....	89
5.4	Environmental (Protection) Act, 1986 .....	90
5.5	Environment Impact Assessment (EIA).....	91
5.6	Public Consultation Process for EIA.....	92
5.7	Important Legislations Regulating the EC in India.....	93
5.8	Case Studies .....	98
5.8.1	Selection criteria for the projects considered for case studies .....	98
5.8.2	Case studies of 12 road projects.....	100
5.8.3	Case study 1: Angul – Sambalpur, NH-42.....	100
5.9	Specific Conditions .....	101
5.10	General Conditions .....	102
5.11	Compliance of Environmental Laws .....	103
5.12	Focused Group Questionnaire on Environmental Clearance .....	105

5.13	Discussion.....	107
5.14	Summary.....	108
5.15	Conclusions .....	108
CHAPTER 6 PROJECT FINANCING .....		111
6.1	Introduction .....	111
6.1.1	Indian financial institutions.....	115
6.1.2	Commercial banks and financial institutions.....	115
6.1.3	Bank financing.....	116
6.1.4	Lending capacity of other financial institutions to transport infrastructure sector.....	116
6.1.5	Financing models in early stages of private sector participation in India.	116
6.1.6	Determinants of PPP investment .....	117
6.1.7	User fee financed PPP projects.....	117
6.2	Major Problems Faced by PPP Developers.....	118
6.2.1	Asset liability mismatch (ALM).....	119
6.2.2	Re-financing risks .....	120
6.3	Contentious Issues and Proposed Solutions .....	121
6.4	Analysis of Financial Structuring in the Infrastructure Projects (BOT Toll Road Projects) .....	125
6.5	Insurance and Pension Funds .....	126
6.6	Challenges of Debt Financing and Bond Market in India.....	127
6.7	Non-Performing Assets (NPA) .....	128
6.8	Financial Structuring Over the Years.....	129
6.9	Raising of Finance Worldwide.....	130
6.10	Salient Financing Steps to Further PPP Projects in India.....	131
6.10.1	Viability gap funding (VGF) .....	131
6.10.2	Risk evaluation by banks for pricing and setting terms of lending.....	132
6.10.3	Foreign direct investment .....	133
6.10.4	Direct government interventions.....	133
6.11	Case Studies.....	135
6.12	Issues in Toll Collection.....	136

6.12.1	Detailed composition of projects .....	136
6.12.2	Determination of concession period .....	137
6.12.3	Concession period determined by considering tollable traffic .....	138
6.12.4	Inconsistency in considering traffic volume .....	140
6.13	Details of PPP Road Projects Worldwide.....	140
6.14	Land Acquisition, Environmental Clearances and Financing Issues .....	142
6.15	Time and Cost Overrun .....	142
6.15.1	Time overrun analysis of projects.....	142
6.15.2	Cost overrun analysis of projects.....	145
6.16	Focused Group Questionnaire on Project Financing.....	146
6.17	Discussion.....	147
6.18	Conclusion.....	148
CHAPTER 7 ARBITRATION AND LITIGATION .....		151
7.1	Introduction .....	151
7.2	Dispute Resolution Mechanisms.....	159
7.2.1	Court cases pending adjudication .....	159
7.2.2	Case study 1: Bhubaneshwar–Puri, NH 203 .....	162
7.2.3	Case study 2: Gwalior Bypass .....	163
7.2.4	Case study 3: Indore–Dewas, NH 3 .....	165
7.2.5	Case study 4: Surat–Dahisar, NH 8 .....	166
7.2.6	Case study 5: Farakka–Raiganj, NH 34.....	167
7.2.7	Case study 6: Raiganj–Dalkhola, NH 34 .....	168
7.2.8	Case study 7: Walajahpet–Poonamallee, NH 4 .....	169
7.3	Focused Group Questionnaire on Arbitration and Litigation.....	171
7.4	Conclusions .....	174
CHAPTER 8 TIME AND COST OVERRUNS IN PPP PROJECTS.....		177
8.1	Introduction .....	177
8.2	Time Overruns.....	178
8.2.1	Ongoing projects BOT toll and annuity project.....	179
8.2.2	Completed BOT toll and annuity project.....	184
8.2.3	Relationship between time overrun and year of award, progressively .....	189

8.3	Cost Overruns.....	190
8.4	Summary .....	191
CHAPTER 9 PROPOSED AMENDMENT TO ACTS/ LAWS AND DEVELOPMENT OF FRAMEWORK.....		193
9.1	Introduction .....	193
9.2	List of the Acts, Statutes .....	196
9.3	Development of Framework.....	200
9.4	Framework for Ensuring Smooth Execution of PPP Projects.....	200
9.5	Summary .....	203
CHAPTER 10 VALIDATION .....		205
10.1	Introduction .....	205
10.2	Description of Cases.....	206
10.2.1	Case 1- Gwalior-Jhansi Project of NH-75 (Project ID-O38):.....	206
10.2.2	Case 2 -Panipat-Jalandhar Section of NH-I (Project ID-O13): .....	208
10.2.3	Case 3- Surat–Dahisar, NH 8 (Project ID-O41): .....	209
10.2.4	Case 4-Muzaffarnagar-Haridwar (Project ID-O37):.....	211
10.2.5	Case 5- Delhi-Gurgaon Expressway, NH-8 (Project ID-not applicable):.	211
10.3	Details of Structured Interviews .....	213
10.4	Conclusions from Structured Interviews .....	213
10.5	Conclusions from the Case Studies .....	221
10.6	Validation of Proposed Amendments in Rules and Laws through Structured Interviews.....	223
10.6.1	Conclusions from the structured interviews .....	224
10.7	Summary.....	228
CHAPTER 11 SUMMARY AND CONCLUSIONS.....		229
11.1	Introduction .....	229
11.2	Summary of the Study .....	230
11.2.1	Identification of enabler and barrier attributes.....	231
11.2.2	Mapping of b-attributes on projects.....	232
11.2.3	Land acquisition, environmental clearance and project financing.....	234
11.2.4	Time and cost overrun .....	236

11.2.5	Proposed amendment to rules/laws for countering barriers.....	238
11.2.6	Development of framework .....	240
11.3	Conclusions of the Study.....	240
11.4	Contributions of the study .....	242
11.5	Limitation of the Study.....	243
11.6	Scope for Future Research.....	245
REFERENCES .....		246
	List of Acts and Statutes .....	246
	Works Cited .....	247
APPENDIX A FOCUSED GROUP QUESTIONNAIRE .....		256
APPENDIX B PROJECT DETAILS.....		265
PUBLICATIONS BASED ON THESIS .....		277
BIO DATA OF THE AUTHOR.....		278

## LIST OF FIGURES

---

Figure 2.1 Steps depicting the process under Land Acquisition Act, 1894.....	22
Figure 3.1 Research onion framework (Source: Saunders et al., 2009) .....	53
Figure 3.2 Schematic diagrams for research methodology.....	54
Figure 5.1 Environmental approval process and EC project classification scheme .....	94
Figure 6.1 Changes in financial structure over the years.....	130
Figure 7.1 Stages leading to origin of disputes.....	154
Figure 7.2 Causes leading to alternate dispute resolution, arbitration and litigation in India .....	155
Figure 8.1 State wise distribution of PPP road projects (2005-2019).....	178
Figure 8.2 Time overrun for BOT Toll ongoing PPP projects .....	180
Figure 8.3 Time overrun in % of ongoing PPP road projects (BOT Toll).....	181
Figure 8.4 Time overrun of BOT Annuity ongoing PPP projects .....	182
Figure 8.5 Time overrun in % of ongoing PPP road projects (Annuity) .....	182
Figure 8.6 State wise distribution of completed PPP projects (2005-2019).....	184
Figure 8.7 Time overrun of BOT type completed PPP projects .....	185
Figure 8.8 Time overrun in % of completed PPP road projects (BOT Toll) .....	186
Figure 8.9 Time overrun of Annuity type completed PPP road projects.....	187
Figure 8.10 Time overrun in % of completed PPP road projects (Annuity).....	188
Figure 8.11 Trend in time overrun with the passage of timeline (year of award) .....	189
Figure 9.1 Framework for ensuring smooth execution of PPP road projects .....	201

## LIST OF TABLES

---

Table 2.1 Summary of important findings .....	39
Table 2.2 Comparison of the main causes of litigation in different countries .....	41
Table 3.1 Categories of attributes .....	58
Table 4.1 Comparison of public purpose definition with earlier law .....	75
Table 4.2 Institutional structure under RFCTLARR Act 2013.....	77
Table 4.3 e & b-attributes for land acquisition, rehabilitation and resettlement issues in PPP road projects .....	80
Table 5.1 Projects where forest land required diversion and where wild life clearance was required (as on 29.09.2014) .....	95
Table 5.2 Summary of key environmental acts/rules in India .....	97
Table 5.3 Road projects and time taken for granting EC.....	99
Table 5.4 Analysis and mean value of responses .....	106
Table 6.1 Recommended financing strategies for different conditions (Adapted from Schaufelberger et al. 2003) .....	113
Table 6.2 Sources of infrastructure financing (Source: Planning Commission 2012c) (All figures in million USD) .....	116
Table 6.3 Contentious issues impeding financing of PPP projects.....	124
Table 6.4 Sectoral distribution of PPP projects by value (Infrastructure PPP financing in India, 2007 report) .....	125
Table 6.5 Sources for debt for infrastructure project(Infrastructure PPP financing in India, 2007 report).....	126
Table 6.6 Extra burden on road users due to longer concession period (CAG report, 2014) .....	138
Table 6.7 Details of time and cost overrun of PPP projects (MoSPI 2019) .....	144
Table 6.8 Analysis and mean value of responses .....	146
Table 7.5 Proposed solution to the b-attributes of arbitration, disputes and litigation ...	172
Table 8.1 t-Test: Two-sample assuming equal variances .....	183
Table 8.2 Results of regression analysis .....	189
Table 8.3 Cost overrun in respect of ongoing projects .....	191
Table 10.1 Details of the Gwalior-Jhansi Project of NH-75.....	207

Table 10.2 Details of the Panipat-Jalandhar section project.....	208
Table 10.3 Details of the Surat–Dahisar, NH 8 project .....	210
Table 10.4Details of Muzaffarnagar-Haridwar project .....	211
Table 10.5 Results of case studies and structured interview for validation of b-attributes .....	215
Table 10.6 Summary of results of structured interviews .....	221
Table 10.7 Summary of results of case studies .....	222
Table 10.8 Validation results of structured interview for proposed amendments .....	225
Table 10.9 Summary of results from structured interviews.....	228

## LIST OF ABBREVIATIONS

---

ALM	Asset Liability Mismatch
b-attributes	Barrier Attributes
BOOT	Build, Own, Operate and Transfer
BOT	Build, Operate and Transfer
CAGR	Compound Annual Growth Rate
CEC	Central Empowered Committee
CRZ	Coastal Regulatory Zone
DMRC	Delhi Metro Rail Corporation
e-attributes	Enabler Attributes
EC	Environmental Clearance
EIA	Environmental Impact Assessment
EPA	Environmental Protection Act
EPC	Engineering Procurement and Construction
FC	Forest Clearance
GDP	Gross Domestic Product
HC	High Court
INR	Indian Rupee
IRC	Indian Road Congress
JV	Joint Venture
MoRTH	Ministry of Road Transport and Highway
MoSPI	Ministry of Statistics and Programme Implementation
NH	National Highway
NHDP	National Highway Development Project
PAP	Project Affect People
PFI	Private Finance Initiative
PH	Public Hearing
PPP	Public Private Partnership
RBI	Reserve Bank of India

RFCTLARR	Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement
RoW	Right of Way
R&R	Rehabilitation and Resettlement
SC	Supreme Court
SH	State Highway
SIA	Social Impact Assessment
SPCB	State Pollution Control Board
WPI	Wholesale Price Index
VGf	Viability Gap Funding