Multifaceted Analysis on PPP Based National Highway Development Program in India

（インドにおける PPP ベースでの国道開発計画に関する多角的分析）

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Abstract

In 2005 India announced a plan to launch an unprecedented scale of national highway development program called NHDP III. The Government's decision was to apply a PPP scheme to all national highways (NHs) regardless of their commercial viabilities. This appeared to be an overly ambitious plan as the private sector has not yet been fully ready for undertaking such a large-scale program under a BOT-based PPP scheme. In spite of this problem, the Government decided to proceed with the plan as originally planned. Nine years later, with 85% of the NHDP III having been processed, it is worthwhile to look into the implementation issues encountered by NHDP III from three different angles: (i) institutional, (ii) risk sharing, and (iii) economic aspects. The institutional aspect of the study found that major but temporary delay happened by a rather unexpected reason, a human X factor. An analysis indicated that under the usual circumstances the human X factor would not affect much the overall performance of the program, but it can if it is combined with institutional frictions formed in the organization. The study described how these institutional frictions had formed and how the human X factor had seeped into the system and exerted influence. A major finding of the risk sharing aspect of the study was that India's PPP system has been uniquely designed. It was able to secure the private sector participation without offering a lucrative set of fiscal incentives as has been offered by many developing countries. This was made possible in India by adopting a combination of hard-liner and soft-liner approaches in a well targeted manner. The economic aspect of the study was designed to examine, with use of the value-for-money (VfM) assessment, whether the adoption of the PPP has brought about significant savings to the government. Before conducting the assessment, the applicability of the current VfM methodology (which was primarily designed for unitary payment type projects) on the BOT type projects was checked. The finding was that it is not applicable unless several modifications are made. The paper spelled out what modifications are needed. Having the modified version of the VfM assessment been made available, it was applied to NHDP III. The finding was a positive Value-for Money for NHDP III. Since this is a single value estimate, its robustness was examined by applying Monte Carlo Simulation. It was found that the above estimate is robust since the VfM has been kept positive for almost all possible combination of risks associated with the public sector execution of projects. This indicated that the adoption of BOT based PPP to NHDP III was a correct decision.

Keywords: BOT, PPP, India, NHDP, Value-for-Money, Monte Carlo Simulation

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Table of Contents

List of Figures and Tables

Abbreviations

ADB	Asian Development Bank
ASB	Adjusted Shadow Bid
BOT	Build Operate and Transfer
CAG	Controller and Auditor General of India
CoI	Committee of Infrastructure
CPI	Consumer Price Index
CRF	Central Road Fund
CVC	Central Vigilance Commission
DEA	Department of Economic Affairs
GASB	Governmental Accounting Standards Board
GoI	Government of India
IAS	Indian Administrative Services
IDC	Interest During Construction
IIFCL	India Infrastructure Finance Company Limited
IMF	International Monetary Fund
IRC	Item Rate Contract
IRSS	Investment Risk Sharing Scheme
KDI	Korean Development Institute
MCA	Model Concession Agreement
MoF	Ministry of Finance
MoPW	Ministry of Public Works
MoRTH	Ministry of Road Transport and Highways
MoST	Ministry of Surface Transport

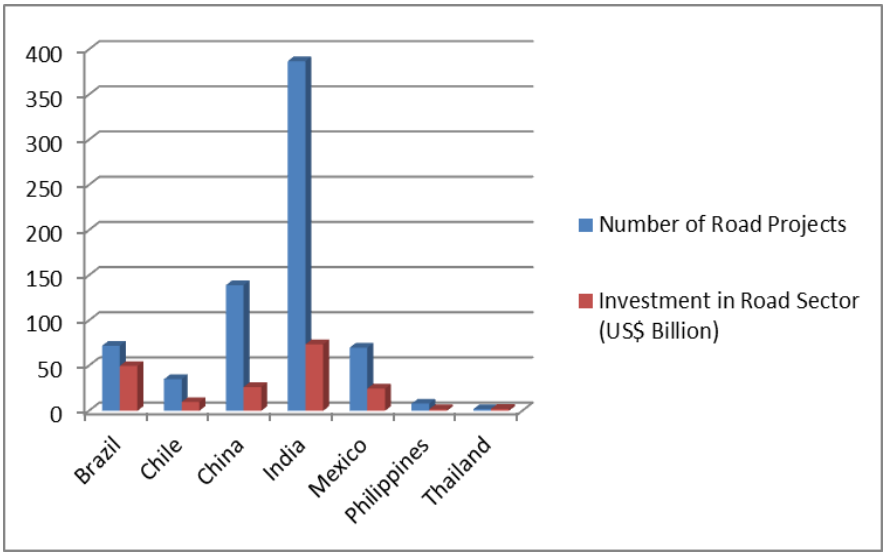
MRG	Minimum Revenue Guarantee
NHAI	National Highway Authority of India
NHDP	National Highway Development Program
NHs	National Highways
NPV	Net Present Value
PC	Planning Commission
PFI	Private Finance Initiative
PIMAC	Private Infrastructure Investment Management Center
PPIAF	Private Participation in Infrastructure Advisory Facility
PPP	Public Private Partnership
PPP (BOT)	Build Operate Transfer Type PPP
PPPAC	PPP Appraisal Committee
PSC	Public Sector Comparator
PwC	PricewaterhouseCoopers
PWDs	Public Works Departments
SMEs	Family Owned Firms
SPV	Special Purpose Vehicle
VfM	Value for Money
VGF	Viability Gap Funding
WACC	Weighted Average Cost of Capital
WPI	Wholesale Price Index

1. Introduction

1.1 Sector Background

1.1.1 Introduction of the PPP for National Highway Subsector

Having experimented with several different types of public private partnership (PPP) projects since 1999, in 2005 India announced a plan to launch an unprecedented scale of PPP programs, one of the largest sets of PPP programs ever undertaken in the developing world (see Figure 1).



Source: World Bank PPI Database (2014)

Figure 1: Number and Investment of PPP Projects in Developing World

The programs were designed for upgrading more than 40,000 km of national highways (NHs) over eight years in five stages (NHDP III-VII). This appeared to be a bold and even precarious decision, given the fact that the PPP scheme was intended to be applied to all national highways, regardless of their commercial viability. The plan included a commercially viable program (NHDP V) for a six-lane key trunk road network, called the Golden Quadrilateral (6,500 km), but also a low-trafficked program (NHDP IV) for widening of 20,000 km of single lane national highways.

1.1.2 Third Phase of NHDP Program

Among these five PPP programs, the Government decided to undertake the third phase

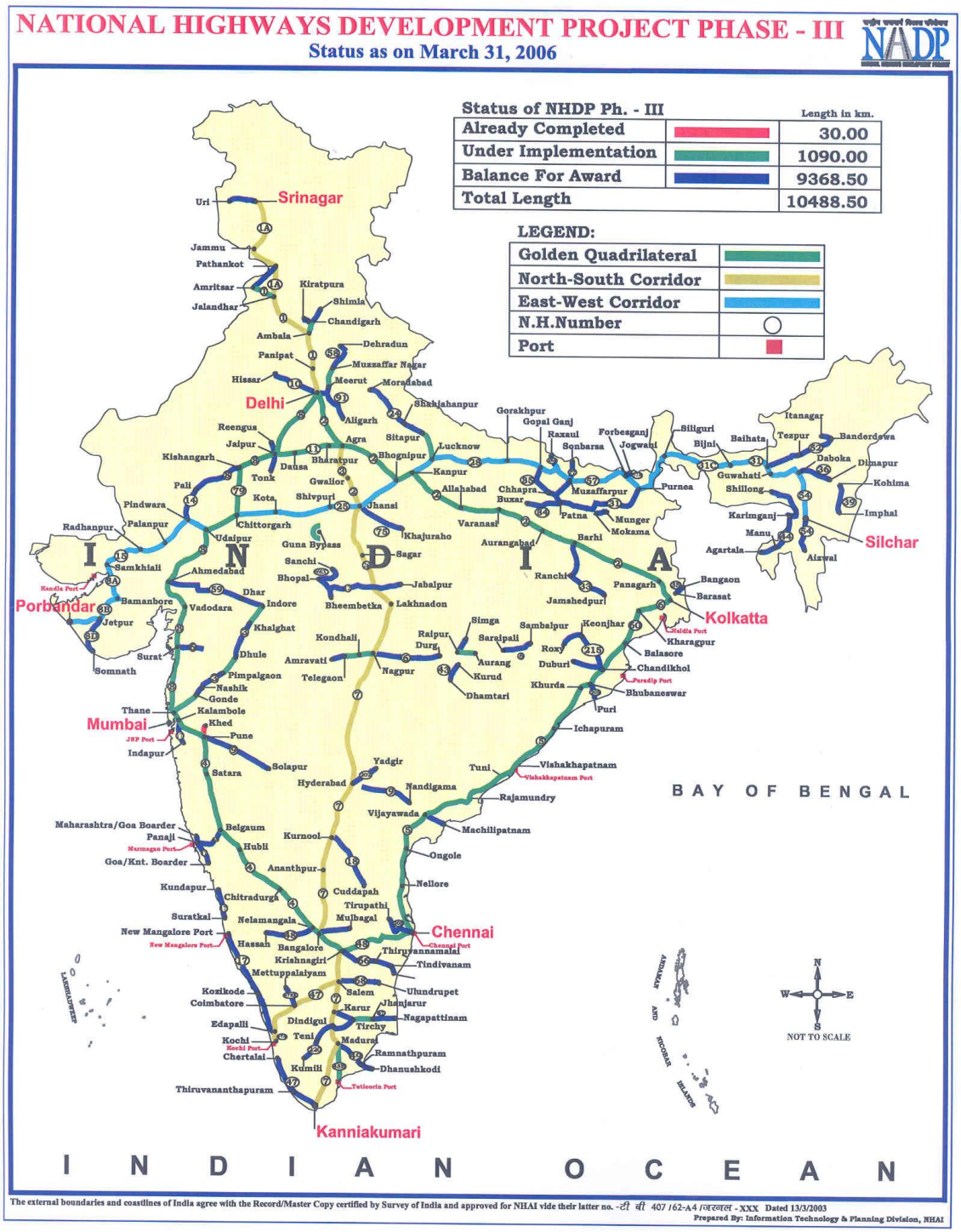
of NHDP (NHDP III) first. The NHDP III consisted of "high-density corridors" and "state capital connectivity highways". "High-density corridors" entail relatively short corridors in length with a high level of traffic. "State capital connectivity corridors" are intended to connect state capitals to one of the three trunk road networks (Golden Quadrilateral, North-South Corridor or East-West Corridor) developed under NHDP I or II. Some of the latter corridors pass through remote or mountainous areas where the level of traffic is thin.

The NHDP III is an amalgamation of the relatively short corridors which are scattered around India as illustrated in Figure 2, whose total length is 12,109 km. The NHDP III was designed to widen two-lane highways to four-lane standards (thus brown-field projects) with an estimated amount of investment of US$18.5 billion. The NHDP III was intended to be completed by putting out over 100 contract packages for bid.

The central element of India's PPP scheme is the Viability Gap Fund, which is based on BOT-based PPP (hereinafter called as PPP (BOT)). However, given the diverse range of traffic density, the PPP (BOT) may not always be a viable option. Because of this problem, specific procurement arrangements have been introduced.

PPP (BOT) is a preferred mode of procurement for the Government of India (GoI). Thus, all projects have to be put for bid first under a PPP (BOT) scheme. NHs are not allowed to be put for bid using other forms of PPP unless no bidders have shown up in the first round of bidding (ADB, 202).

If the first round of bidding fails to attract bidders, NHAI is allowed to invite bids for Annuity based PPP (hereinafter called as PPP (Annuity)). PPP (Annuity) is more attractive for private investors since the entire costs of construction and subsequent operations are covered by the government by "annuity payments" (which is a variation of "unitary payments" to be discussed further in Chapter 4) although these are deferred payment basis.



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https://www.google.com/search?q=India+NADP+Phase+-+III&biw=1536&bih=678&source=lnms&tbm=isch&sa=X&ved=0ahUKEwjfivnNqYrNAhXDHZQKHXbzCNEQ_AUICCgD#imgrc=AM4NVu3q-rEbwM%3A

Figure 2: Map of NHDP III

Several problems loomed. Whatever form of contract taken, the PPP requires contractors to finance the costs of development by themselves and operate the projects for dozens of years. These are immense burdens for most of the contractors. The construction industry of India is highly fragmented with 99% being either family-owned businesses or small/medium scale enterprises (The World Bank, 2008). They are not yet ready to undertake such large-scale PPP programs. Another problem is that, if NHs are to be developed under the PPP, those NHs have to be converted from non-toll to toll roads. This is most likely to meet strong opposition from local communities.

In spite of these problems, the NHDP III went forward. Having been designated as an implementation agency for PPP programs, the National Highway Authority of India (NHAI) immediately undertook processing NHDP III in 2005. Nine years later, 85% of NHDP III has now been processed with contracts having been awarded to contractors. Among those already processed projects, 80% are under the BOT based PPP system, 16% are under Annuity based PPP, and the remaining 4% are under traditional item rate contracts[1]. Given the size of the Program, this is a significant achievement for PPP by any standard.

1.2 Research Questions

Whenever planning to undertake a large-scale PPP program, a policy planner has to check the following three questions associated with implementation: (i) deliverability of the program; (ii) likelihood of private sector participation; and (iii) justifiability of the introduction of the PPP. All of these questions are essential to ensure the successful implementation of the program.

These three interrelated issues will be addressed in the specific context of NHDP III. More specifically, the following three research questions are pursued in this paper.

> ***Research Question 1****: Is the Government capable to deliver a large-scale PPP program in spite of various constraints of the government of India?*
>
> GoI has chosen NHAI as an executing agency, which has been known for its capability to deliver highway programs. This appears to assure the deliverability of

[1] Estimated by the author on the basis of presentations by Mr. Nitish Goenka, IIT Kanpur, and Dr. Jha, IIT Delhi at the Workshop on PPP in the Road Sector, held on October 26, 2013.

the PPP program. But, the processing of NHDP III has soon experienced a major delay for the period of 2006-2009. Why has this happened?

Research Question 2*: Is the private sector ready for undertaking the PPP programs in spite of adverse environment for the private sector participation in the PPP?*

While the government plays a central role in the implementation of PPP, an equally important player is the private sector. The construction industry of India is highly fragmented with 99% being either family owned or small/medium sized enterprises. In addition, the type of PPP contract chosen by the GoI was a BOT based PPP, the riskiest form of PPP, in which contractors have to finance the costs of development by themselves. This is not easy. Under such circumstances, the private sector is less likely to participate in the PPP. However, against all expectation, once the program started, the private sector HAS participated. What has made this possible? Are there any underlying factors that have facilitated them to participate?

Research Question 3*: Will PPP cost less to the government than the traditional public sector comparator will?*

The main reason for the government to introduce PPP is the cost savings of infrastructure development by letting parts of costs to be shouldered by the private sector. However, given the huge amount of contingency liabilities to be assumed by the governments, the answer to the above question would not be that obvious if the life-cycle cost is counted. An issue here is whether the PPP formulae for the NHDP III has brought about, or is likely to bring about, a significant level of cost savings to the government.

1.3 Purposes of the Research

The Research is aimed at finding answers to the above three inter-related research questions in sequence so as to gain deeper understanding of underlying factors that determine performance of the PPP.

Since NHDP III is in an advanced stage of processing, the above sector-wide issues are

analyzed in light of operational experiences of NHDP III. Thus the purpose of the Research is rephrased in the following manner so as to put these issues in the context of NHDP III implementation:

(1) NHDP III experienced major delay in the early stage of implementation. What were the causes of the delay?

(2) While NHDP III has experienced delay in the early stage of implementation, the private sector has participated in the NHDP III in spite of less-favorable contractual arrangements. What specific measures have been effective in getting the private sector to participate? Are there any India-specific factors that have contributed to the creation of this situation?

(3) Has the government achieved a significant level of cost savings through the replacement of the public sector procurement by the PPP? If so, what is the magnitude of the savings?

1.4 Research Methodologies

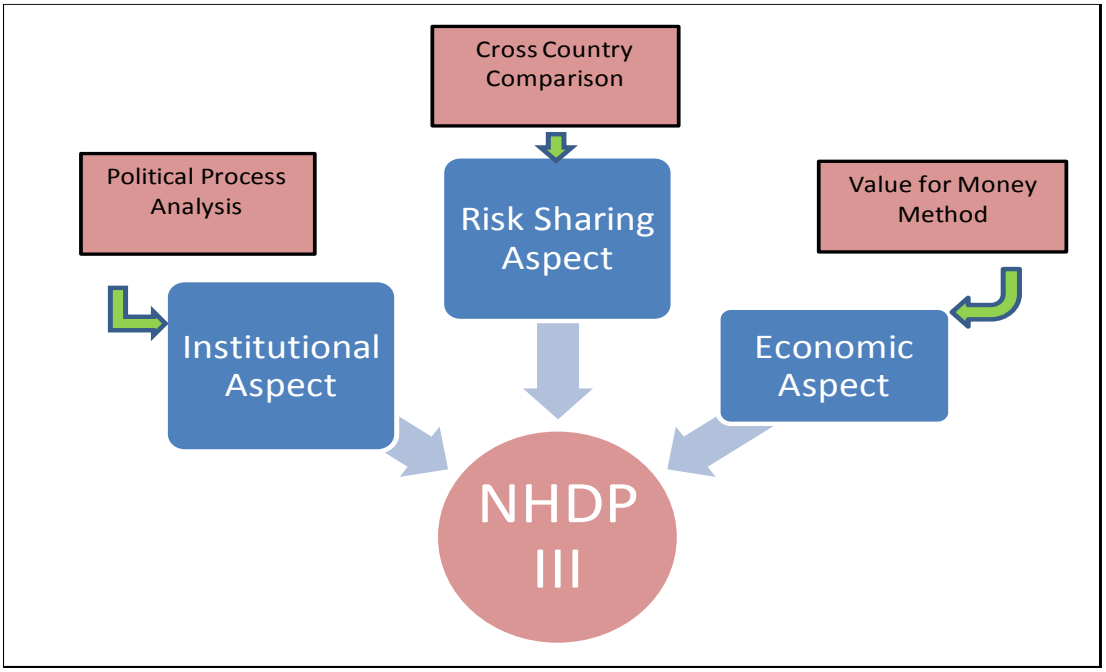
Research is conducted in a three-pronged manner, in which the PPP issues are addressed from three different angles: (i) institutional; (ii) risk sharing; and (iii) economic aspects with use of methodologies listed below (see Figure 3).

(1) The prong 1 study is intended to respond to the first question referred to in the above section. As a part of the process of the prong 1 study, a political process analysis (refer to the Section 2.4) would be conducted to analyze the intricate inter-agency relationship in the government

(2) The prong 2 study is intended to respond to the second question referred to in the above section. As a part of the prong 2 study, a cross-country comparison would be conducted so as to identify the comparative features of India's contractual arrangements.

(3) The prong 3 study is intended to respond to the third question referred to in the above section. For this purpose, a "value for money (VfM) methodology" would be used to estimate the magnitude of savings to be obtained by the government

through the adoption of the PPP system.



Source: Prepared by the author

Figure 3: Three-Pronged Approach

In the course of the Research, field study was conducted in India in September 2013. A series of interviews was carried out with officials from the Planning Commission, Ministry of Finance (MoF), Ministry of Road Transport and Highways (MoRTH), NHAI, Asian Development Bank (India Resident Mission) and Deloitte Touche India to gather relevant data for the above analyses. Additional field study was conducted in September 2014 in Korea to meet professional staff of the Public and Private Infrastructure Investment Management Center, Korean Development Institute (KDI).

In addition, the author brings a wealth of first-hand experience of projects developed and implemented in India. The author worked for 8 years with MoF, MoRTH and NHAI as a task manager for several lending projects for NHAI (see Footnote 1 for those projects)[2]. The paper has thus reflected first-hand insight on the mechanism underlying

[2] Task manager for the development of: (i) Western Transport Corridor Projects; (ii) East West Corridor Project; (iii) National Highway Sector Development Project (I); (iv) Multi-sector Project for Infrastructure Rehabilitation for Jammu and Kashmir; and (v) Multi-tranche Finance Facility for PPP program for the NH subsector, totaling US$ 1.2 billion in loan amount. Beside these, the author also managed the processing of a number of TAs and supervision of a few projects. But, since the task management for the development of the projects are much more important and thus those other TA operations are not listed here.

the policy formulation processes within the government and unique nature of the PPP.

1.5 Focus of the Research

Given the wide spectrum of Public Private Partnership (PPP), it is desirable to first clarify the specific kind of PPP that this paper aims to study. PPP can be defined as a long-term contractual arrangement between the public and private sectors for the delivery of infrastructure services with use of government assets or assets constructed by the private sector in accordance with specific requirements of the government. A PPP typically includes: (i) the public service concession (unitary payment scheme); (ii) availability payment scheme (annuity concession); (iii) Build Operate Transfer (BOT) type PPP arrangement (PPP (BOT)); or (iv) BOT scheme.

As indicated in Figure 4, a PPP can be schematically characterized by two yardsticks. One is whether it is service-oriented or investment-oriented, and the other is which side of the parties would primarily assume commercial risks between the government and private sector. Based on these two yardsticks, the relative positioning of the above four types of PPP has been illustrated in Figure 4 below.

The type of PPP to be dealt with in this Research is the BOT based PPP (as indicated in the dark red in Figure 4). As seen earlier, India's PPP is essentially built on the Viability Gap Fund system, which is actually based on the PPP (BOT).

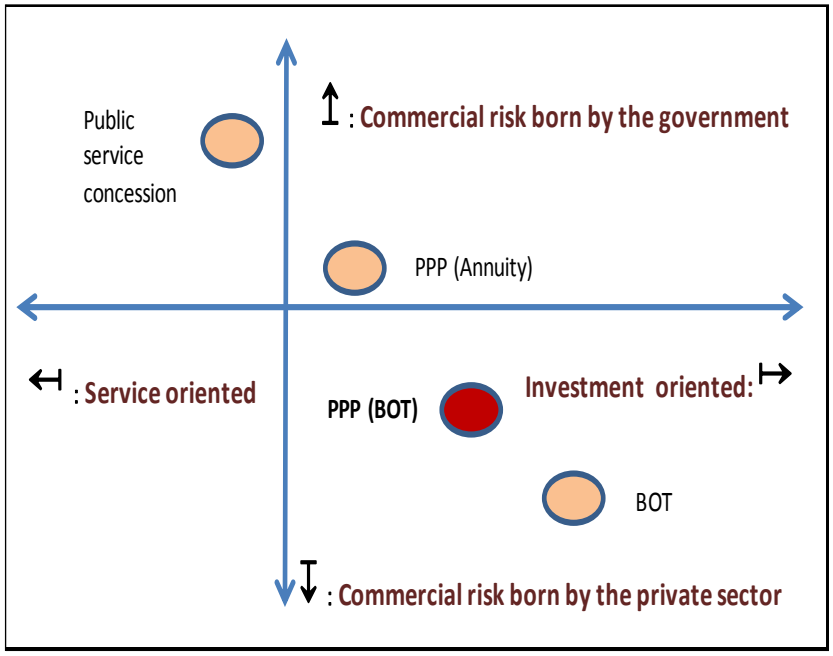


Figure 4: Relative Position of the PPP (BOT) in the Whole Spectrum of PPP[3]

1.6 Structure of the Dissertation

To facilitate the review by readers, this section will present a brief overview of individual chapters.

Chapter 1 is to introduce the issues to be addressed, together with the purpose of the Research. It also provides a sector background and introduces the NHDP III, which will be a main focus of this dissertation.

Chapter 2 investigates the institutional aspect of PPP issues. Its primary focus is analyzing how top-down decisions of the government have led to friction between the central government and the executing agency. This Chapter starts with a review of the existing literature, based on which the evolution of policy frameworks for the increased participation of the private sector in the national highway subsector is described. It then proceeds to the author's analysis of political dynamics underlying the formulation of the PPP policy. It finally moves to the analysis of a specific operational issue, the delay in delivery of NHDP III. Focus is placed on how a human "X factor" has started affecting the implementation of the NHDP III.

Chapter 3 analyzes the risk-sharing aspect of PPP and describes how this is handled in concession agreements for BOT-based PPP. The Chapter starts with a review of the existing literature, based on how structural vulnerabilities of BOT were formed. Then the discussion moves to the identification of possible risk mitigation measures to deal with these vulnerabilities. The comparison of these measures has led to the identification of salient features of the PPP system in India. It concludes with an in-depth analysis on underlying factors that have enabled India to take measures that are significantly different from other countries.

Chapter 4 focuses on economic analysis of the impact of the introduction of a PPP system into NHDP III. The Chapter begins with the review of the existing guidelines for Value for Money (VfM) assessment. Discussion follows, examining the applicability of the VfM methodology to BOT type projects. Having found that the current method of VfM is not directly applicable to the BOT type project, recommendations follow

[3] Prepared by the author

regarding how the current method of Value for Money needs to be modified. Finally, this reformulated version of the VfM methodology will be applied to NHDP III to demonstrate its validity.

Chapter 5 concludes by highlighting the major findings of the three-pronged study. It details the implications of this paper on the application of the BOT-based PPP system to the road sector of developing countries. It also presents the theoretical contribution of the paper, together with the limitation of the Research.

2. In-depth Analysis of the Institutional Aspect

2.1 Overview

The primary purpose of this Chapter is to address the first topic listed in the Research Purposes section of Chapter 1, i.e. analysis of the causes of the delay of NHDP III. To address this issue, the Chapter starts with a review of the existing documents associated with policy and institutional frameworks for the introduction of the private sector in the NH subsector. The Chapter then proceeds to an in-depth analysis of inter-agency frictions between the central government and the executing agency using a political process analysis. Having gained insight on the political dynamics underlying the formulation of the PPP policy for India, the paper then focuses in on the identification of causes of the delay of NHDP III.

2.2 Literature Review (Sector Background)

Of the research on the topic of the PPP for NHDP, particularly important are studies prepared by the Government of India and the Asian Development Bank (ADB)[4]. Similarly consulting firms published several reports, all of which discussed policy and institutional framework of the PPP[5]. few have analyzed implementation issues.

No literature exists on the specific topic of the causes of the delay in the implementation of the NHDP III that took place from 2006-2009. While it was a major issue for the government at that time, it has yet to be examined in an academic context. The author, who was a task manager of ADB for three large-scale projects for NHAI, was several times consulted by officials of the NHAI with regard to how to deal with this specific problem. For NHAI, it was a critically important issue since quick delivery of the NHDP III was one of the priority agenda for the then Monmohan Singh Administration. One reason why the author decided to academically examine this issue is that the specific implementation issue seems to conceal hidden factors that are often overlooked, but potentially exert a major impact on the performance of the PPP program ("X factor"). Examination of how this "X factor" seeps into the system and exerts influence over the implementation of the programs is worthy of study.

[4] Planning Commission (2009), Planning Commission (2014) and Asian Development Bank (2007)
[5] KPMG (2009), McKinsey & Company (2009), Pricewaterhouse&Coopers (2007)

With the above-noted backdrop regarding the originality of this research, the literature review focuses on capturing the evolution of private participation in NHDP programs. This is intended to provide a sector background needed for understanding of the specific implementation issue noted above. A review of the findings of existing research is presented in three stages: (i) initial stage for the introduction of the private sector in the national highway subsector; (ii) experimentation stage for the private sector participation in national highway development programs (NHDPs); and (iii) the full-fledged implementation of PPP for NHDP.

2.2.1 Initial Stage

Ramakrishnan & Raghuram (2012) provide an insight on the introduction of the PPP for the NHDPs. According to this paper, the Government of India (GoI) started, in 1992, exploring the possibility of getting the private sector to participate in NH development. Following several preliminary actions, a major step was taken by the Government in 1995 by establishing a high level task force at the Ministry of Finance, called "Expert Group on Commercialization of Infrastructure Projects", chaired by a well-known economist, Rakesh Mohan[6], then Director General, National Council of Applied Economic Research. A year later, the Expert Group came up with a recommendation for the introduction of BOT and its variation of the PPP as a principal method of Infrastructure financing (Expert Group on Commercialization of Infrastructure Projects, 1996).

(1) Legal Base for Private Sector Participate in the NH Subsector

Having received recommendations from the Expert Group, then Ministry of Surface Transport (MoST), a predecessor of the current Ministry of Road Transport and Highways, took an important step in 1995 by amending the National Highway Act of 1956 by incorporating a clause to "allow the government to enter into an agreement with the private sector to let them to construct, maintain and operate the parts of national highway networks" (Ramakrishnan & Raghuram, 2012). Importantly, the amendment also included another clause to allow the private sector to charge fees to the users of the facilities they constructed.

[6] Former Deputy Governor of Reserved Bank of India, and the current Executive Director of India at IMF

After establishing the legal basis for the participation of the private sector, the MoST prepared a policy note in 1996 indicating the need to upgrade two-lane corridors of national highways (NHs) to four-lane standard. The policy note also included a recommendation that, once the NHs are upgraded to four lanes, those highways should be converted to toll roads. This series of actions paved the way for the private sector to participate in the development of NHs.

(2) Establishment of an Implementation Agency

Tsukada (2013) provided a detailed account of the establishment of an implementing agency specialized in the construction and maintenance of NHs. Up until the operationalization of the National Highway Authority of India (NHAI), the MoST did not have its own operating arm for NH development. Construction and maintenance of NHs were delegated to Public Works Departments (PWDs) of state/provincial governments. While overall development plans had been formulated by the MoST, there was no assurance for these plans to be implemented in line with the timetable drawn up by the MoST. Since PWDs are state-level or provincial level agencies, they do not place priority on the development of national highways. They tend to undertake the construction of state roads first and then move on to national highways. To resolve this long-standing administrative problem, the GoI decided to establish its own arm for construction and maintenance by promulgating the Act for National Highway Authority of India in 1988.

Although the NHAI Act entered into force in 1988, it took 7 years to become operationalized with the assignment of a chairman and necessary staff. An important element of the NHAI Act was to accord managerial autonomy to the NHAI Board, which was structured as an "empowered committee". As an empowered committee, the Board includes representatives of key ministries (Ministry of Finance, Planning Committee, MoST) and, as such, its decisions are regarded as being approved by these ministries. This arrangement has enabled NHAI to process the projects in an expeditious manner without going through lengthy consultations with each of these ministries (Asian Development Bank, 2001). Established as a semi-autonomous body of government, NHAI can serve as a legal entity to enter into contract with the private sector directly, which has immensely facilitated the legal negotiation with the private sector.

(3) Announcement of National Highway Development Programs (NHDP I & II)

An underlying factor that underpinned the accelerated development of policy and institutional frameworks was the launching of National Highway Development Programs (NHDP) announced by the A.P. Bajpayee Administration in 1998. The first phase of NHDP (NHDP I) was designed to upgrade 5,846km of Golden Quadrilateral to four-lane standard, while the second phase of NHDP was designed to upgrade North-South and East-West Corridors of 7,142km to four-lane standard, both of which were to be implemented under the public sector procurement (Masuda, 2013). The implementing agency for these programs was NHAI.

To secure necessary funding for the implementation of these massive programs, the GoI decided to increase excise duties levied on vehicle fuel. The increased portion of the excise duties was earmarked for highway development. This tax revenue was first deposited into the Central Road Fund (CRF), which was then be allocated to various road subsectors. About one third of the CRF was allocated to NHDP programs. Since funds allocated for specific subsectors are non-lapsable (i.e. the amount of money allocated to a certain subsector for one fiscal year does not need to be returned to the GOI even if there is leftover), the NHAI was able to carry them over to subsequent years. In addition, NHAI was allowed to use the future tax revenue as collateral for the borrowing, NHAI was able to mobilize funds from the capital market several times greater than the annual allocation from the CRF (Asian Development Bank, 2003).

Procedural requirements for contract awards were also simplified. Under normal procedures, a public sector investment project larger than US$20 million must be approved by the Public Sector Investment Board of India. However, in consideration of the importance of NHDPs, the Investment Board accorded blanket approval for the entire programs of NHDP, exempting the NHAI from approvals on a project-by-project basis (Asian Development Bank, 2001).

(4) Facilitation of the Land Acquisition for NH Development

The greatest bottleneck for the delivery of infrastructure projects is land acquisition. To deal with this issue, the National Highway Act of 1958 was amended to make it clear that, as far as national highways are concerned, the century-old “Land Acquisition Act of 1894” would not be applied. Instead, once the project is designated as domain of

public interest, the accelerated process of compulsory land acquisition is activated. Since any delay in hand-over of the land immensely affects the performance of the private sector, the introduction of streamline procedures for land acquisition has provided a significant comfort to the private sector for the participation in PPP programs.

2.2.2 Experimentation Stage

As a part of the implementation of NHDP I and II, NHAI started experimenting with a BOT scheme. Under this scheme, a selection criterion for bidders was how little bidders would request NHAI to pay for capital subsidy or how much extra the private sector would pay to NHAI to get the right to operate the designated section of the NH system. NHAI also experimented with another PPP scheme, an Annuity scheme. Under this scheme, bidders compete with each other for the lowest amount of annuities (semi-annual periodic payments) to be paid by NHAI during the period of concession. In the case of an annuity scheme, tolls are collected by the concessionaire, and handed over to the government. Thus tolls are not their source of revenue, rather they receive periodic payments from the government. As such, the annuity concessionaire does not assume commercial risks (but does assume construction and financing risks).

Having experimented with different types of PPP schemes during the period of implementation of NHDP I and II, NHAI requested PricewaterhouseCoopers (PwC) to conduct an evaluation comparing three types of procurements – BOT, Annuity scheme, and the traditional public procurement scheme called Item-Rate Contract (IRC) (PwC, 2007). The findings of the comparison are summarized below.

1) The BOT is far superior to the other two forms of contracts. The construction cost of BOT is 30% lower than that of IRC. BOT projects are completed, on average, 1 month earlier than the originally anticipated schedule, while IRC construction showed delays of 16 months on average.

2) The Annuity scheme showed less impressive performance than BOT scheme, but still outperformed IRC, reaching completion 13 months earlier than IRC.

3) IRC shows the poorest performance among the three procurement methods. In particular, cost overrun has been conspicuous, pushing up the total project cost

by 20%.

The above clearly indicates the desirability of BOT, distantly followed by the Annuity scheme, with the least desirable being IRC.

2.2.3 Full-Fledge Implementation Stage

Based on these experiments, the GoI decided to adopt PPP as the principal method for infrastructure development. This was made explicit by the decision of the Committee of Infrastructure (CoI) in 2004. The central element of the PPP system was the introduction of the Viability Gap Fund (VGF) to be provided to the private sector to let them to recover a portion of capital expenditures so as to ensure each project is financially viable. In order to examine the suitability of the PPP project for the VGF system, the PPP Appraisal Committee (PPPAC) was established with a primary responsibility of determining the amount of VGF to be provided to individual projects. PPPAC consists of "Secretary"-level officials of the Planning Commission (PC), Ministry of Finance (MoF), and concerned line ministries (Secretary of Committee on Infrastructure, 2009).

As a part of the overall infrastructure development plan, the CoI announced a full-fledged program of developing national highways in January 2005. The plan was designed to upgrade 33,000 km of NHs under the PPP scheme in five stages (NHDP III – VII) from 2005 to 2012 with a total investment of US$41.4 billion (see Table 1). It covers both commercially viable and non-viable segments. Six-laning of the Golden Quadrilateral is likely to fall under the former category, while two-laning of single lane NHs is likely to fall under the latter category. Among these five programs, NHDP III was chosen to be implemented first, which is described in detail in the next section.

Table 1: PPP Programs for NH Development (NHDP III-VII)

Programs	Contents	Length	Costs
NHDP III	Increasing capacity of high-density corridors & state capital connectivity NHs to four-lane highways	12,109 km	$18.5 billion
NHDP IV	Increasing single-lane NHs to double-lane capacity	20,000 km	$5.6 billion*
NHDP V	Upgrading Golden Quadrilateral to six lane-standard	6,500 km	$9.3 billion
NHDP VI	Constructing expressways (new highways)	1,000 km	$3.8 billion
NHDP VII	Constructing ring roads, bypasses, grade separators & service roads	700 km	$4.2 billion

Source: Estimate in 2013 by Indian Brand Equity Foundation (IBEF)

2.3 Analytical Framework for Identification of Causes of Delay

Having reviewed the NH subsector based on the existing literature, it is now useful to overview the operational issue of the delay in the implementation of NHDP III.

2.3.1 Delay in the Implementation of NHDP III

Having been designated as an implementing agency, the NHAI immediately started implementing the third series of programs, i.e. NHDP III. The implementation started well in 2005/06, awarding contracts for sections totaling 5,378 km. However, the pace of delivery began to slow in 2006/07 and 2007/08, and almost stalled in 2008/09 at a level of just one-eighth of the first year (643 km) (See Figure 5). The pace of delivery eventually rebounded when a new minister was assigned (in 2009).

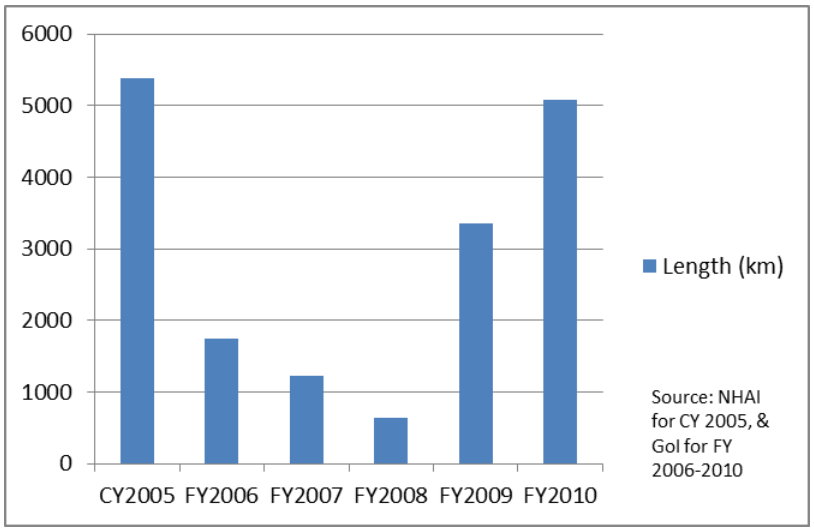


Figure 5: Delay in Implementation of NHDP III

2.3.2 Approach for the Analysis of Causes of Delay

As seen in the preceding sections, India established a well-crafted and robust policy framework. A series of policy actions were taken in order to get the private sector to participate in NH development. It has also established a strong institutional arrangement. A particularly important is the designation of NHAI as an executing agency. NHAI has been well known for its capability of delivering programs as demonstrated by the excellent track record of NHDP I and II.

The establishment of robust policy and institutional frameworks appears promising the smooth implementation of the NHDP III, but as we have seen in the above section, the NHDP III has suffered a major, but temporary set-back in the pace of processing. Having observed this, three hypotheses have been set out. The essence of these hypotheses is that the above two strong policy and institutional factors have been undermined by some other and less discernible factors which would be called X factors in this paper.

- Hypothesis 1: The highly centralized institutional arrangements for the PPP initiatives has led to the adoption of the centrally planned PPP system, a system preferred by coordinating agencies. This was not a kind of the PPP system that the executing agency wanted to have.

- Hypothesis 2: The adoption of the centrally planned PPP undermined the implementation capability of the executing agency, which has lowered the performance of the executing agency. This has resulted in institutional frictions between coordinating agencies, line ministry and executing agency.

- Hypothesis 3: While the existence of institutional frictions itself does not necessarily affect the performance of the executing agency, it has created a situation easier to be intruded by X factors. An opening/crack thus created in the government which has allowed a human factor to seep into the system and caused a major delay to program implementation.

The rest of the Chapter would be devoted for the examination of these hypotheses.

2.4 Institutional Analysis of the Selection of the PPP System

This section is intended to examine the validity of Hypothesis 1 by conducting the political process analysis on the intricate interplay between the government agencies. The political process analysis referred here is an analytical tool to be used for finding what specific position will be adopted by relevant government agencies or political units with regard to a specific policy issue through the analysis of organizational mandates of each organization, their priority agenda at the time of that specific issue being discussed, specific personnel who are in charge of at the time, together with the

interplays between these organizations.

2.4.1 Two PPP Policy Options

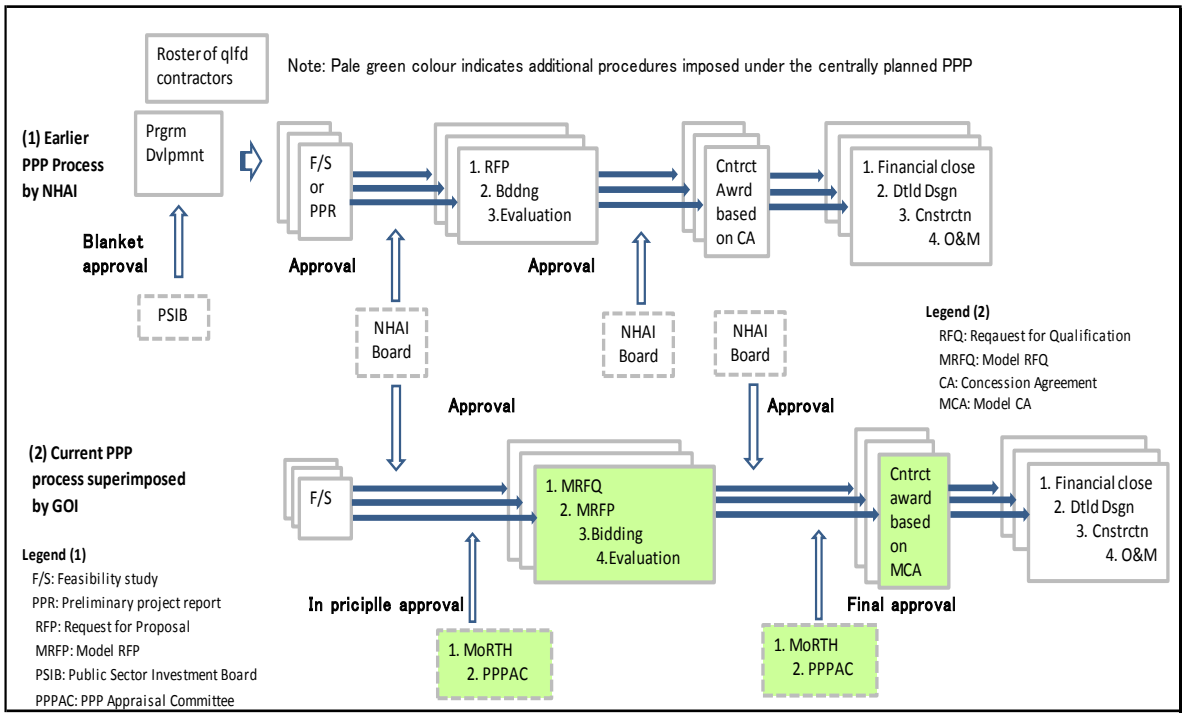
A central issue debated at the time of the policy deliberation for the above PPP programs was the selection of institutional arrangements for the implementation of the PPP-based NH development. Two policy options were available for the NH subsector at that time: (i) the PPP system developed by NHAI through the experimental implementation of PPP, based on the principle of the programmatic approach under the managerial autonomy accorded to NHAI Board (hereinafter referred to as the NHAI version of PPP scheme), and (ii) a centralized PPP system formulated by the Planning Commission (PC) and Ministry of Finance (MoF) which was to be applied on a cross sectoral basis under the oversight of these two coordinating agencies (hereinafter noted as the centralized version of PPP scheme).

An advantage of the NHAI version of the PPP system is a proven system which has been in practice for years. Even before the GoI announcement of the introduction of PPP in 2005, 15% of NHDP I and 30% of NHDP II had already been implemented under this version of the PPP system (Goenka, 2013). In this sense, it is proven. Another advantage of this system is that it would entail a lesser number of administrative clearances, which would obviously enable PPP projects to be processed faster. It is also in line with the current legal framework established by Act of NHAI which has accorded managerial autonomy to NHAI without being directed by the line ministry, i.e. MoRTH. However, this is the exact point that the newly elected Minister of MoRTH[7] did not appreciate. He wished to be involved more in the decision making process of the NHDP programs.

Meanwhile, the Planning Commission and Ministry of Finance, two key and powerful coordinating agencies, intended to apply their version of PPP system to all infrastructure sectors in a uniform manner under their direct supervision. According to their view, all projects should be approved by PPPAC. In addition, this approval should be on a project-by-project basis since the amount of VGF has to be estimated and paid for each project. This project-based approach was in keen contrast to the programmatic approach introduced under the NHDP implementation.

[7] His initial is TRB. Please see Footnote 13 for more detail.

Under the centrally planned PPP system, the approval process is much more cumbersome because of its two stage approval process – one for "in principle approval" before invitation for bid is issued, and then "final approval" after bids have been received and evaluated. Each time, NHAI has to get their projects reviewed by MoRTH first and then to be submitted to the PPP Appraisal Committee for their consideration. Figure 6 illustrates differences in procedural requirements between the centrally planned and NHAI version of PPP systems, in which green colored portions indicate the additional steps to be taken under the centrally planned PPP system.



Source: Tsukada (2013)

Figure 6: Difference in Process between PC and NHAI versions of PPP

There is another problematic area in which the views of the Planning Commission and NHAI sharply contradicted each other: the contents of a model concession agreement (MCA). NHAI developed a version of MCA in the late 1990s based on earlier experiences with the Jaipur Kishangarh Project (Ramakrishnan & Raghuram, 2012). The Planning Commission, however, developed its own version of the MCA later. NHAI had major difficulties in accepting this PC version of the MCA because of the timing of the handover of land to the private sector. NHAI's view is that the land acquisition takes longer and thus it's difficult to hand over the required level of land in time. Another problem was that the revenue sharing scheme set out by the PC version of

MCA is overly complicated and does not enhance the level of competition among bidders. In their view, a negative grant system would be much more straightforward and promote competition among bidders. Because of this difference in view, NHAI refused to use PC version of MCA until 2009 in spite of the official endorsement of this version of MCA by Committee of Infrastructure in 2005 (Ibid.)

In spite of the above-noted advantages of the NHAI PPP system, the centralized PPP system was adopted. An issue here is why NHAI views were ignored. was it simply due to the superior authority of the PC or are there any other factors that led to this decision? Answering this question requires an in-depth analysis on political dynamics having existed at the time of the policy deliberation in the government. This follows in the next section using political process analysis.

2.4.2 Political Process Analysis

Political process analysis requires the identification of key players in the government. While the stakeholders for PPP programs include the government, project companies, lenders and users, this analysis confined to the government. The reason for narrowing range of stakeholders to the government only is that the analysis focuses in on the policy formulation process within the government. Thus, the key players analyzed here are: (i) Planning Commission; (ii) Ministry of Finance; (iii) Ministry of Road Transport and Highways (MoRTH); and (iv) NHAI.

What position individual ministries/agencies take for a specific policy issue is not only determined by organizational mandates, but also by key personnel who happen to be in position at the time of the policy deliberation. The analysis thus looks into the following aspects: (i) organizational mandates and responsibilities; (ii) key personnel in charge at the time of policy formulation; and (iii) position likely to be taken by individual ministries/agencies with regard to the selection between the two options for PPP, namely, the centralized PPP scheme and the NHAI version of PPP scheme. The results of the analysis are presented in the tabular formats listed below.

Planning Commission

Organizational mandates and responsibilities
• The Planning Commission was established in 1950. The PC has a rather unique status

within the central government. It is not a statutory body as in the case of other ministries/agencies, but was established by a Cabinet Decision as a body to formulate five-year plans, annual plans for the nation and other relevant policies. While the official head of the PC is the Prime Minister, the real management of the PC is carried out by its Deputy Chairman, who has a rank of full cabinet member (Government of India, Planning Commission, 2014).

- This rather unique, but less secured status of the PC, tends to drive it to constantly re-invent itself as a lead agency for various policy initiatives including PPP (Tsukada, 2014). The PC's policy orientation has gradually shifted from planning by targets to planning by indicators with stronger market orientation (Government of India, Planning Commission, 2014).
- This unsecured status is reflected in the recent announcement by the newly elected Prime Minister, Narendra Modi, regarding his intention to scrap the PC and replace it with a new agency.

Key personnel

- The then Deputy Chairman[8] had served in this position for 11 years, from 2004 to 2014; an unusually long period of time for a cabinet level position. He was a former staff member of the World Bank and also the International Monetary Fund (IMF). He held senior positions as a civil servant, including Commerce Secretary and Finance Secretary. He has often appeared in the media whenever policy issues are discussed as almost a virtual spokesperson of the government for various policy initiatives.
- His key policy advisor was an IAS officer, whose title was Advisor to the Deputy Chairman of the PC[9]. Earlier he had served as Joint Secretary of Department of Economic Affairs (DEA), MoF. He played a leading role in the formulation of the PPP policy, including preparation of Model Concession Agreement.

Positions likely to be taken on this specific issue

- The centralized PPP scheme should be applied on a cross-sectoral basis in a standardized manner.
- The PC first drafted an MCA in 1998 and revised it in 2005, the latter of which was endorsed by the Committee of Infrastructure in 2005. While the PC does not have any

[8] Initials of his name are MSA. Full name would be provided upon request to the author.

[9] Initials of his name are GH whom the author met during his field visit in September 2013. He is 1973 batch of IAS officer. While his ability for policy formulation has been well recognized in the GoI, he has a unique style of negotiation and persuasion if put in a mild way. His style could be indicated by his insistence for a copy right for the government document. There is words, BH and AH. This means that "Before Haldia" and "After Haldia". (Business Standard, Vinayak Chatterjee, Who upset GH, Sep. 15, 2008, New Delhi)

sector-specific authority to enforce the use of the centralized version of the MCA, the PC insisted that it should be applied to NHDP III and subsequent NHDP programs. This intention was realized through making it as a decision of CoI.

Ministry of Finance

Organizational mandates and responsibilities

- The MoF is a coordinating agency in the central government, which is responsible for the allocation of national budget to individual sectors often through line ministries, and securing tax revenue for the nation. Amongst several internal departments of the MoF, the DEA plays a central role in the formulation of economic policies including PPP and also in the preparation of annual national budgets.

Key personnel

- The Finance Minister[10] at the time was an experienced politician who had served as Finance Minister three times and also Home Affairs Minister, another powerful position in the central government of India, which is responsible for internal security including the police force. He was formerly a corporate lawyer with ample interactions with business communities. He is a graduate of Harvard Business School with significant exposure to international affairs.
- The then Joint Secretary in charge of DEA and also Infrastructure[11] played a central role in the formulation of the PPP policy and in the operationalization of the PPP policy with establishment of PPP cells at both central and provincial governments under the assistance of ADB. He was later promoted to Finance Secretary when the above Finance Minister was reappointed to MoF as a minister in 2012.

Positions likely to be taken on this specific issue

- PPP should be the principal mode for financing infrastructure. This would enable MoF to reallocate funds from economic infrastructure to social sectors, the latter of which would have no other source of fund besides the government budget.
- A VGF should be provided to those projects that are viable. Thus, all projects seeking VGF should be evaluated on a project-by-project basis.

[10] Initials of his name are PC. He has been affiliated with National Congress Party.
[11] Initials of his name are AM, with whom the Author met regularly during 2004-2007. He is 1978 batch of IAS officer.

- PPP should be implemented in accordance with the decision by CoI. Thus MoF took a position in favor to the centralized PPP scheme.

Ministry of Road Transport & Highways

Organizational mandates and responsibilities

- MoRTH is a line ministry in charge of NH sub-sector and road transport sector.
- MoRTH established NHAI as an implementing agency for NH development to which significant level of managerial autonomy was accorded by virtue of the 1988 Act for NHAI. MoRTH has, however, kept authority to appoint the chairman of NHAI.

Key personnel

- The then MoRTH Minister was a long-time politician with a career spanning over 50 years. His political career started at the state level, and he eventually became the leader of one of the local parties in India, the DMK, which represents ethnic groups in Tami Nadu and its neighboring states in southern India. He is known for his unique style of management[12]. During his tenure (2004-2009) as Minister for MoRTH, he changed the chairman of NHAI, five times[13], an unprecedented frequency. This five-year period is also known for the slow progress of NHDP programs and also port development programs, both of which were under the jurisdiction of MoRTH.

Positions likely to be taken on this specific issue

- Usually, the line ministry represents the view of its subordinate agencies under its oversight, in this case, the view of NHAI. However, in this specific case, MoRTH did not take this position. Further, MoRTH didn't question the effectiveness of the centralized PPP system.

National Highway Authority of India

Organizational mandates and responsibilities

[12] Initials of his name are TRB. According Indian Express of May 12, 2009, he was a muscle man of DMK, and reversed the earlier progress of NHDP and port programs. During this career as a politician, he was reported to be jailed 20 times for the participation in demonstration. He was also reported to be a center of controversy for illicit allocation of gasoline to his family business.

13 Initials of the names of the chairmen assigned by then Minister were SN (2006), PK (2007), JSM (2007), NG (2008), JS (2009)

- NHAI is an implementing agency, not a policy agency. Thus its view cannot be directly reflected in GoI's policy deliberations, but only through its line ministry, i.e. MoRTH.
- As indicated earlier, the NHAI was accorded managerial autonomy by virtue of the NHAI Act. The establishment of the NHAI Board as an empowered committee enabled NHAI to make decisions without going through individual consultations with relevant ministries.

Key personnel

- The first and second chairmen were appointed by earlier ministers for five and three years respectively. Their successors were appointed by the then MoRTH Minister referred to in the earlier box. Their durations of service were much shorter than those of earlier chairmen (sometimes only for a few months). This instability in the chairman position made it easier for the Minister to influence the decision making of NHAI.

Positions likely to be taken on this specific issue

- Since the NHAI pioneered the PPP scheme, NHAI should be allowed to continue their version of PPP scheme for NHDP III and subsequent PPP programs.

2.4.3 Contributing Factors for the Policy Selection

While the above section has explained why different positions were taken by each of these ministries/agencies for this specific issue, it does not fully explain why a centrally planned PPP scheme was adopted by the Government. This section is intended to look into these factors that have led to the above selection.

(1) Top-down Style of the Decision Making

At the time of the early 2000s, a priority agendum for the then Congress Party-led Administration was the development of infrastructure. There was a strong view in the Administration that infrastructure development should be conducted under a PPP arrangement given the huge scale of investments needed to be made. This was officially adopted by the Committee of Infrastructure, which was chaired by then Prime Minister, Manmohan Singh. Since the Prime Minister is concurrently the chairman of the Planning Commission, the Commission naturally became the secretariat office of the CoI, a position in which the view of the Planning Commission can be easily reflected. Since it was of the view of the PC that the PPP should be implemented on a cross

sectoral basis in a uniform manner, the PC insisted on the centrally planned PPP system to be adopted as a modality of PPP for NH subsector (Tsukada, 2013).

(2) Missing Point of Argument in the Policy Deliberation

The major justification for review by the PPP Appraisal Committee was the allocation of the viability gap fund to individual projects. But, the NHAI has its own sources of funds, which is the excise tax on fuel called "CESS". Since the use of these funds can be determined by the "empowered" NHAI Board, the NHAI does not need to seek the PPPAC's approval for securing funds for a VGF. However, this important aspect of the argument had never been brought up to the table of discussion in the policy deliberation processes in the government.

2.4.4 Finding of the Institutional Analysis

Having reviewed the above elements, NHAI was supposed to mount a strong argument against the adoption of the centrally planned PPP system. However, NHAI was not able to do so. The reason is that the NHAI was not a policy agency, but an executing agency. NHAI was, thus, unable to take part in the policy deliberation. NHAI's view can only be reflected through the line-ministry, i.e. MoRTH. However, at that time, MoRTH did not take up the view of NHAI for policy discussions with coordinating agencies. In the early 2000s, the NHAI was in the limelight in the government with the impressive accomplishments of delivering NHDP I and II, but not MoRTH was. This delicate relation between with NHAI and MoRTH affected the position of MoRTH.

2.5 Formation of Institutional Frictions

This section is intended to examine the validity of Hypothesis 2 by discussing the consequence of the above policy selection.

Once the centrally planned PPP system is adopted, it has undermined two success factors of NHAI which have enabled the Authority to deliver the program fast: (i) a programmatic approach (which had enabled NHAI to process the program in an expeditious manner); and (ii) managerial autonomy accorded by NHAI Act (which had enabled NHAI to keep MoRTH away from operation of NHAI).

Under the centrally planned PPP system, all PPP projects need to be reviewed in advance by PPP Appraisal Committee, which was not required under the programmatic approach. In addition, the centrally planned PPP system has created a new responsibility for MoRTH to prescreen all NHAI projects before being submitted to PPPAC. This has given MoRTH an opportunity to intervene in NHAI's operations, which has undermined the managerial autonomy of NHAI.

Having their critical success factors been undermined, the relationship between the central government and NHAI have become increasingly strained with the resultant formation of institutional frictions, which have opened up cracks from which X factors can seep into.

2.6. Analysis of Causes of Delay

This section is designed to examine the validity of Hypothesis 3.

2.6.1 Possible Impact of a Human Factor

As seen earlier, the NHDP III started well in 2005, but its pace of processing has been slowed down in 2006 and almost stalled in 2008. This period of the delay has coincided with the tenure of a specific politician having served as Minister for MoRTH. Upon his departure from the Ministry, the pace of processing has bounced back again. This may get the people suspect the possible connection between the delay and a human factor. While there were a number of media reports on the excessive interventions of the Minister[14], it is not an author's intention to find who is to be blamed for, but to examine the possible connection between the above two factors and, if it is the case, analyze what circumstance has led a human factor to seep into the system and exert influence over the performance of the executing agency.

Assuming an influential politician has been assigned for the top position of a line ministry, this assignment may affect the performance of those sectors, either positively or negatively. Although the politicians may wish to exert influence over the policy

14 Priyanka Talwar, the Economic Times, January 14, 2007; Force Namo, "Road to nowhere", Nov.25, 2013, which referred to then Minister as a cause of the "paralysis" of PPP program. According Indian Express of May 12, 2009, he was a muscle man of DMK, and reversed the earlier progress of NHDP and port programs. During his career as a politician, he was reported to be jailed over 20 times for the participation in demonstration. He was also reported to be a center of controversy for illicit allocation of gasoline to his family business.

directions of the ministry, it is often difficult since a well-established line ministry usually has its own system for insulating themselves from external pressure. Political interventions into the system would often be mildly rejected by a glass-wall of resistance by bureaucrats.

This glass-wall resistance is particularly strong in India where Indian Administrative Services (IAS) officers have strong authority for policy formulation in all spheres of public administration. In such circumstances, it is difficult for an inexperienced politician to intrude into processes and start influencing policy direction toward his/her favor. The intrusion may occur when unfortunate combination of several factors occurs. In this specific case, the following two factors set in.

(1) Assignment of a Specific Politician to the Post of Minister for MoRTH

As described earlier in Section 2.4.2, then MoRTH minister was the long serving politician whose entire carrier of 60 years has been devoted for political activities in the local and then in the center. This made a keen contrast to the deputy chairman of PC and then Minister of Finance, both of whom spent significant parts of their carriers in the professional areas such as legal practices and economic policy formulation. The management style of then MoRTH Minister was significantly different from these two ministers. One of the example of his unique style of management is the frequent change of the chairman of NHAI. During his four years of tenure as a minister, a chairman of NHAI has been changed five times. The tenure of the chairman of NHAI is 3 years with possible extension of another 2 years.

(2) Creation of a New Function for MoRTH

Another factor is the creation of a new responsibility for NHAI under the centrally planned PPP system. MoRTH was given a new function of prescreening all PPP projects before being submitted to PPP Appraisal Committee. This has given MoRTH an opportunity to intervene in the operations of the NHAI. Then Minister of MoRTH who was not happy about NHAI's managerial autonomy, was quick to grasp this opportunity to intervene in the operations of NHAI with resultant initial delay in processing.

2.6.2 Chain Reactions of Delays

Increased delays in project processing (including bidding, contract awards and approval of contract modifications) increased frustration among consulting firms and contractors. This led to increased reporting of irregularities and corruption to vigilance authorities. Irregularities had long existed at NHAI, but those had rarely been reported to the authorities since they were considered part of the usual business for road construction. However, once processing of projects was delayed enough, affected parties took different actions out of grudge or frustration for the accumulated delays in processing (Tsukada, 2013).

The increase in reporting or allegations of irregularities and corruption, allowed the Central Vigilance Commission (CVC) of the GoI to tighten its grip on the NHAI's activities. Similarly, the Controller and Auditor General of India (CAG) also started to intensify its audit activities against NHAI operations by posting a resident auditor at NHAI to conduct investigations regularly. A media reported that "Despite of the official statement by NHAI officials of zero corruption, the flurry of media reports on alleged corruption in the highway sector make it difficult to dispel the image that the industry is indeed corruption free"[15]. For instance, on October 2006, the CVC charged four senior NHAI officials with corruption, forgery, cheating and abuse of official position[16]. In May 2010, CVC again registered a case against two senior officials of the NHAI for allegedly abusing their official position and favoring a particular construction company in award of contracts[17].

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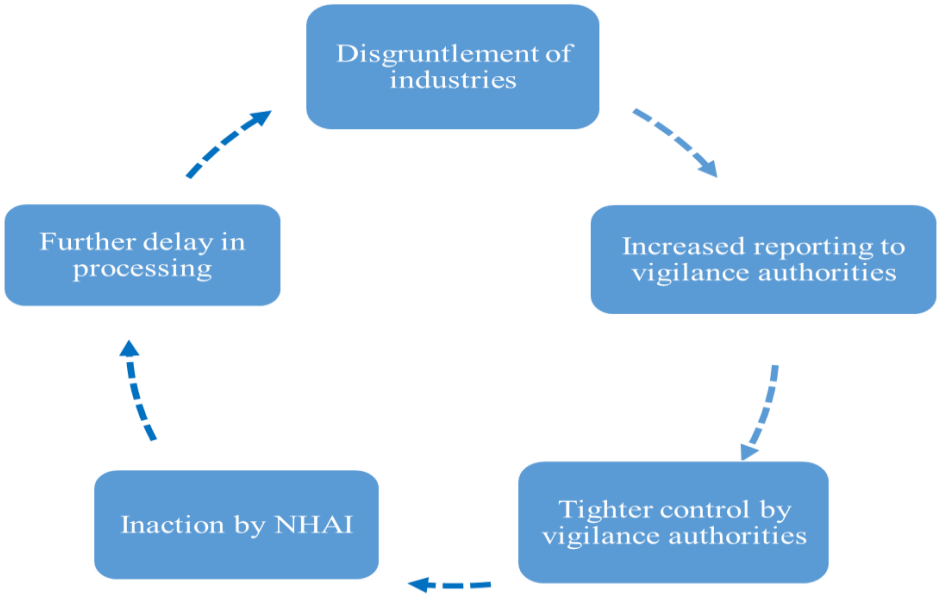
[15] Bhattacharya, May 4, 2012, *Road Building Still Tarred with Corruption,* Wall Street Journal, Retrieved August 31, 2016 from http://blogs.wsj.com/indiarealtime/2012/05/04/road-building-still-tarred-with-corruption/

[16] Mohan, Oct 18, 2006, *Four NHAI officials charged with corruption,* Hindustan Times, Retrieved August 31, 2016 from http://www.hindustantimes.com/india/four-nhai-officials-charged-with-corruption/story-QNKH0XecRSTz8SVOlXa0EO.html

[17] Taboola, May 25, 2010, *CBI files corruption case against top NHAI officers,* Press Trust of India. Retrieved August 31, 2016 from http://www.ndtv.com/india-news/cbi-files-corruption-case-against-top-nhai-officers-418995

In March 2012, the World Bank sent a report to the central government indicating corruption of NHAI on three highway projects they had financed. The report accused private road contractors of "fraudulent and corrupt" practices.

Subject to increased scrutiny by these agencies, NHAI staff became extremely cautious about processing the projects. They minimized contacts with staff of consulting firms and contractors. The resultant lack of information left many questions unanswered, which made decision making even more difficult. This created a vicious cycle of delay, disgruntlement, allegation and investigation. By the end of 2007, NHAI's operations nearly froze. This is illustrated in Figure 7.



Created by S. Tsukada

Figure 7: Chain Reactions of Delays

2.7 Lessons Learned from Implementation of NHDP III

Having identified the causes of the delay, a couple of recommendations were formulated as below.

(1) Prevention of Political Interventions

One of the reasons for implementation delay of NHDP III was increased interventions by MoRTH, particularly by the then Minister (2005-2009), in NHAI operations. While

this problem has now, by and large, been resolved by the departure of this specific Minister, the potential of risk still exists. The issue is whether it is possible to eliminate this kind of risk entirely from the operations of executing agencies. Obviously it is not possible given the current democratic system of the government in which the head of a line ministry tends to be selected from the politicians of majority parties who have made major contributions to the majority party in parliamentary activities or elections.

The possibility of arbitrary interventions by politicians can be minimized in certain types of government agencies such as the Fair Trade Commission, Maritime Accident Investigation Agency and other quasi-judicial agencies. In the case of these agencies, policy decisions are made collectively, in other words, by a committee, not by an individual sitting on the top of the organization. Other examples of this type of decision making include the policy boards of the many central banks, such as the Federal Open Market Committee of Federal Reserve Board of US or the Policy Board of the Bank of Japan.

For line ministries, collective decision-making is also possible to be introduced for specific areas of activities such as setting up tariff and selection of winning contractors, but it is not easy to implement because of resistance to change. In this regard, India's case for the prescreening of qualified people for Chairman of NHAI provides a useful hint for solution.

Having seen the excessive use of authority for the appointment of a chairman of NHAI by the above Minister, the Government report on the review of the performance of the 11th five-year plan (2007-2012) recommended "Selection of a chairman (of NHAI) by a Search Committee headed by Cabinet Secretary" (Planning Commission, 2011, p.351). Based on this recommendation, a Selection Panel consisting of secretary level officials of Planning Commission, Ministry of Finance, Home Affairs Ministry and MoRTH. The Selection Panel first developed selection criteria and qualification requirements. The selection of the chairman has been made in this manner since then. This mechanism has significantly reduced the possibility of the abovementioned risk.

(2) Need to Avoid Duplicate Application of Two Systems

If one implementing agency is performing reasonably well, the government should not consider replacing it with another system, even if the new system appears promising.

The introduction of a new system requires changes to the existing institutional set-up. It should be noted that the existing institutional set-up is often the result of various efforts to resolve earlier sets of problems. It is often a second-best solution, which is the result of various compromises. Sudden change to the existing set-up may lead to the opening-up of a Pandora's box. Once the box is opened, a variety of the earlier set of institutional problems may surface again. The real world does not require the best performing system, but rather a reasonably-well functioning one.

2.8 Remarks

PPP has often been hailed by both public and private sectors as the combination of the best of both worlds – the efficiency of the private sector and the pursuit of the public interest. However, given the extensive involvement of the government in the process, together with the provision of subsidies to the private sector, PPP may provide decision makers with rent-seeking opportunities or other opportunities for seeking irregular benefits. It should be noted that PPP always carries this type of risks, which often invites intervention by politicians. The policy planners should be aware of this potential risk and be encouraged to incorporate mechanisms to prevent the intrusion of this discernible form of influence. Possible mechanisms to prevent this from happening again include, among others, the replacement of individual decision-making processes with collective decision-making processes through the establishment of a committee for specific areas such as tariff setting or selection of top management.

3. In-Depth Analysis on Risk Sharing Arrangements

3.1 Overview

This Chapter is intended to address two issues; (i) identification of salient features of India's PPP system; and (ii) finding underlying factors which have enabled India to secure the private sector participation in the PPP. Analyses in this Chapter would be conducted in such a manner to examine the validity of the following two hypotheses.

- Hypothesis 1: India has come up with PPP measures uniquely designed to address the vulnerability issue of BOT. To understand how unique these measures are would require cross country comparison.

- Hypothesis 2: While India's PPP measures are less attractive to the private sector, India was able to secure the private sector participation. This was due to the combination of soft-liner and hard-liner approaches. In this regard, the research would look into the industrial structure of India's construction industry.

The examination of the above two elements would constitute main elements of his Chapter. Chapter 3 begins with review of the origin of the BOT with an aim to identify its structural vulnerabilities. Once vulnerabilities of BOT are identified, the paper would then move to a cross-country comparison between India and other countries. This would lead to the identification of unique structure of India's PPP. Once the unique structure of India's PPP is identified, the research would proceed to the discussions on underlying factors which have contributed to the private sector participation in India's PPP.

3.2 Literature Review (Structural Vulnerability of BOT Contract)

This paper takes a position that the PPP is an effort to overcome the vulnerabilities of BOT (See Section 3.3 for more discussion). This requires, as a prerequisite, the understanding of structural vulnerabilities of BOT. A best way to do so is to trace back its origin of the BOT and review how it is structured. For this purpose, existing research papers were reviewed. Major findings are summarized below.

3.2.1 Genesis of BOT Scheme

Walker & Smith (1989) stated that the term, Build Operate Transfer, was first used for the Cross Harbor Tunnel Project in Hong Kong in mid-1950s, but the concept was not fully elaborated at that time. Fully developed concept of the BOT had to wait until the 1980s. At that time, the project finance concept was popular in the UK for oilfield projects (Croce & Gatti, 2014). This is the time in which the idea of applying the project finance concept to infrastructure projects instead of oilfield projects had emerged under the name of BOT. This innovative design enabled the European construction industry to offer to the Turkish Government a possible way to develop infrastructure without using the money of the Turkish Government. Essential elements of the proposal of European construction industry were defined by Tsukada (2014) as follow:

- The Government grants the right to build infrastructure, and to operate it for a specific period of time (say, 30 years) to the project company.

- The project company builds and operates using their own funding and recovers these costs through future revenue flow to be generated from user charges.

- Infrastructure facility developed in this manner is then transferred back to the government at the end of the above period.

This proposal was obviously welcomed by the Turkish Government since they would be able to deliver infrastructure without funding it. In addition, the government would be able to retain ownership of the facility at the end of concession. The proposal of the European construction industry appears generous toward the government, but it was also designed as beneficial for the European construction industry since they were able to make use of excess capacity that had been a long-standing problem.

3.2.2 Structural Vulnerabilities of BOT Contract

On the surface, this seems a little bit like magic: “infrastructure gets built at no cost to the government and the government would eventually gain ownership after a set period”. Tsukada (2012) provides an explanation as to why this magic-like structure is possible. His view was that the combination of three concepts has made this possible: (i) public service concession; (ii) special purpose vehicle (SPV)) and (iii) non-recourse finance. These three concepts form the crux of the BOT scheme, but it should be noted that these

concepts also serve as the sources of the structural vulnerabilities of the BOT.

(1) Non-recourse Finance

Non-recourse finance, also known as project finance, has often been used for energy exploration or mining projects such as the North Sea Oil Project developed in the 1960s (Kaga, 2007), but it had rarely been used for infrastructure projects. In the case of energy exploration projects, there are "off-takers" who have committed themselves long-term in purchasing all products to be generated by the project, but in the case of road projects, there are no such off-takers. There are many potential users for highways, but it is difficult to get concrete long-term commitments to use (and pay for the use). If there are alternatives and potential users switch to these alternatives, the economics of the project become severe and the concessionaire suffers.

To minimize this possibility, the project proponents can ask a consultant to carry out a demand forecast before launching the project, but forecasts are potentially unreliable even if conducted by an internationally reputable consulting firm. There is a consistent tendency to overstate demands, while understating costs. The difficulty in demand forecasting has made infrastructure immensely risky with regard to commercial viability. It is true that project finance has enabled construction to start and facilities made ready for users, but there is no guarantee for those users to choose to use (and pay).

(2) Public Service Concession

Public service concession is another key component of the BOT. The concession scheme has long been employed when the governments intend to delegate the provision of the public services to the private sector for a long period of time. According to Walker and Smith (1989), the first concession was granted to Perier Brothers in 1782 by City of Paris in the area of water distribution. This was followed by a much broader wave of concessions in the 19th century, which were found not only in France, but also in Spain, Italy, Belgium and Germany.

Under the concession scheme, the private sector is given an exclusive right to operate the government's facilities for the provision of service to the general public. Since this type of service falls under the public domain, the private sector assumes the obligation to provide the service in accordance with public service requirements set out in the

concession agreement. In addition, when the above concession comes to an end, the facilities must be returned to the government.

This concept of returning assets to the government still exists under the current form of BOT as indicated by "Transfer". The difference between BOT and traditional concession schemes is the shift of emphasis from service provision to construction and subsequent operation of the facilities. Under the BOT scheme, the private sector is allowed to construct facilities in accordance with their own design and engineering standards. This enables the private sector to operate the facility in a more cost-efficient manner with possible chances of earning extra profits.

Another difference between public service concessions and BOT is the greater degree of managerial freedom in the ways of operating facilities. Particularly important is broader price setting freedom. It should be noted, however, that this price-setting freedom is often restricted by the governing authority because of the public service nature of the operation. The concessionaire is expected to provide services within the affordability of the general public. If the concessionaire charges users beyond the deemed affordability, the government may intervene. Meanwhile, if the intervention is excessive, this can jeopardize the commercial viability of the private sector operation. In a nutshell, BOT concession provides the private sector with both privilege and obligation, which may help or hurt their business.

(3) Special Purpose Vehicle

The above two concepts were tactfully wrapped into one contractual package, i.e. the SPV arrangement. Once an SPV is established, it serves as a legal protection against potential claims by financiers for early payments of the loans.

Procedurally, when a consortium of project proponents wins a contract, they form an SPV to which they would make equity investments; in other words, they would become shareholders of the SPV. Part of the initial capital expenditures (often 10-30%) is paid from these equity investments, but the remainder of the capital expenditures is paid by money borrowed from banks or other financiers. While the beneficiaries of these loans are project proponents, they are not the borrowers, rather, the SPV is. In case that the project fails, the lenders can request the SPV to immediately pay back the outstanding loans, but they cannot request project proponents to pay since they are not borrowers

contractually.

Another, and often overlooked, merit of an SPV is that it enables project proponents to be paid upon the delivery of services much earlier than the usual timeframe of the BOT operation. If a BOT project is executed directly by project proponents, they have to wait until the BOT project reaches the full-fledged operation stage and generates "free cash flow". However, having the SPV stand between project proponents and lenders, and getting the subcontracts to be signed between the SPV and project proponents, the latter can be paid upon the delivery of services based on the subcontracts concluded with the SPV. The project proponents, as shareholders of the SPV, can easily influence the SPV's selection of subcontractors.

These structural tricks are the exact reasons why lenders have become extremely cautious about extending loans to infrastructure projects on a non-recourse finance basis. If the project fails, the resultant default risk would be borne by lenders. To prevent this from happening, banks often insist on the inclusion of several clauses in the loan agreements. These include step-in rights clause, claw-back clause and the establishment of an escrow account, together with the assignment of an escrow account agent (Kaga, 2007).

Asset/liability mismatch is another reason why lenders are hesitant to lend money to infrastructure projects. Given the large size of initial capital expenditures to be recouped through thinly spread revenue flows during the concession period, it takes a long time to get entire loans to be paid back. Meanwhile, the money used by banks has often been sourced from the financial markets or from depositors, whose tenure is much shorter. This causes major asset-liability mismatches.

3.3 Risk Mitigation Through PPP Measures

This section was primarily devoted to substantiate Hypothesis 1. Review of structure of the BOT in the preceding section has indicated that the following three are the main forms of vulnerabilities of BOT:

- Uncertainty in future revenue flow for infrastructure projects
- Limitation for pricing freedom and resultant difficulties in cost recovery

- Difficulty in securing finance due to the tilted structure of the SPV toward project proponents

As the vulnerable structure of the BOT has been elucidated, the private sector, including both developers and financiers, has become increasingly cautious about investing in BOT. This trend became even more conspicuous after the Asian financial crisis of 1997. Having been exposed to turbulent investment climates in developing countries, financiers started shifting their funds from risky to safe markets, or from developing to developed countries. This directly affected the availability of funds for non-recourse or limited recourse financing projects, which has resulted in a significant reduction in the number of BOT projects in developing countries in the late 1990s.

As they witnessed the waning interest of the private sector in BOT operations, many developing country governments started offering risk mitigation measures to enable private investors to effectively deal with the vulnerabilities of BOT identified earlier. Since these risk mitigation measures are so extensive, the BOT scheme is now more appropriately called a Public Private Partnership. In this manner, PPP (BOT) can now be understood as "an effort to overcome the vulnerabilities of BOT with provision of a variety of economic incentives and/or guarantees". Those measures taken for dealing with these vulnerabilities under the framework of the PPP are hereinafter called PPP measures.

3.3.1 Cross-country Comparison on PPP Measures to Deal with Vulnerabilities

This section reviews a variety of PPP measures taken by several countries. Through comparison of these measures, the section is intended to crystalize the salient features of India's PPP.

(1) PPP Measures to Deal with Uncertainty in Future Demand

A typical PPP measure to deal with demand uncertainty is the minimum revenue guarantee (MRG), which has been widely used in developing countries. If the future revenue fails to reach the originally projected target, the government compensates the difference between the projected and actual revenues. There are basically two types of MRG. One is designed for assisting a project developer (project proponents) by assuring

a minimum level of revenue (which typically covers 70-100% of the projected level of revenue). The other is designed for providing financiers/lenders with assurance of minimum debts to be serviced annually or semi-annually (which typically covers the 50-70% of the projected level of revenue).

Another form of PPP measures is an investment risk sharing scheme (IRSS). The IRSS system was devised in 2009 in Korea based on the earlier experience with MRG in which the project proponent tends to overstate the forecasted level of demand so as to receive a greater amount of compensation from the government (Korean Development Institute, 2014). Under this arrangement, the upper limit of compensation per year is set at a level that would have been incurred if the project had been implemented under the public sector procurement (an approach similar to the concept of Public Sector Comparator introduced as a part of the Value for Money Assessment). An important element of this approach is that this upper limit is determined on the basis of the demand forecast and project costs (including the cost of financing in the form of issuance of government bonds) to be determined by the government but not by the private sector. Thus there is no possibility for the private sector to maneuver/cheat. Another important element of the IRSS is that if concessioner has been paid compensation in one year, they have to pay back to the government for the year when extra profit is earned. By taking this approach, profits are shared between the government and the private sector.

India has come up with a totally different system to deal with this uncertainty issue, which can be called a "flexible concession period system". This scheme is that, if the actual demand has failed to reach the projected level of demand, the concessionaire gets a proportionate extension of the concession period. According to the Model Concession Agreement of India (MCA), when the "Actual Average Traffic has fallen short of the Target Traffic by more than 2.5%, the concession period is extended at the pace of 1.5% for every 1% shortfall". But a caveat is attached: the MCA states that the total period of extension cannot exceed 20% of the originally agreed concession period. An important element of this arrangement is that the government would not incur any pecuniary responsibility to pay in case of revenue shortfall. This is in line with the MoF's long standing policy of minimizing contingent liabilities.

(2) PPP Measures to Deal with Limitation in Price Setting Freedom

A major concern of the project company is the possible restriction of their ability to increase prices and recover the costs. A widely adopted practice to alleviate this concern is to allow the project company to adjust the initial level of tariff upward in parallel to the pace of price escalation (full indexation). A typical metric used for measuring the extent of inflation is either the Consumer Price Index (CPI) or Wholesale Price Index (WPI). Ideally, this tariff adjustment is automatically approved by the relevant authority, but in most cases, it is still subject to approval by the authority.

Another approach is that the government provides operational subsidies to compensate for the losses to be incurred by the private sector if the government failed to approve the price increase application submitted by the private investors in a timely manner.

A slightly different type of the approach is allowing the project company to undertake side business as a part of the project. This enables the project company to supplement inadequate revenue from toll road operation by additional revenue to be raised by the real estate or other side-business. Korean standard concession agreements have incorporated this aspect.

Again, *India* has taken a unique approach, which was a modified version of the above indexation system. India used partial indexation, which is to allow concessionaires to increase only 40% of the change of WPI. The rationale for this approach is that inflation only affects variable costs such as O&M, which often accounts for approximately 40% of the total costs.

(3) PPP Measures Designed for Facilitating Non-Recourse Finance

Once a contract is signed between project proponents (a consortium) and the granting authority, the concessionaire is supposed to reach financial closure within a specific timeframe (180 days, in case of India). Failure to conclude loan agreements in this timeframe results in nullifying the concession contract. In spite of the importance of reaching financial closure in time, it is often not easy for the concessionaire to conclude loan agreements with financiers. This is primarily due to: (i) the tilted structure of the BOT contract; and (ii) asset/liability mismatches. To facilitate the solution of these problems, the government has come up with several measures as enumerated below.

A usual measure taken to resolve this problem is the provision of loan guarantees to the

financiers. The guarantee is usually provided by government as in the case of Brazil (Federal Guarantee Fund) and also in Korea (Infrastructure Credit Guarantee Fund), but sometime by a specialized state run agency. In the case of Mexico, its state development bank BANOBRAS has provided a partial risk guarantee or project enhancement guarantee to the financiers. While this is effective in getting the finance available, this is a costly option for the government since it assumes a significant level of contingent liability. It also causes additional costs to the private investors since they have to pay fees/premium to get the guarantee to be made available to them. Another type of guarantee that is effective to attract specifically foreign investors to the market is protection of fluctuation of foreign exchange. This has been introduced in Chile since most of the BOT operators have been foreign contractors.

A totally different type of guarantee has long been in practice in Chile, the mono-line service. The mono-line service was designed for facilitating the issuance of bonds rather than borrowing from banks. Its basic mechanism is that internationally reputed financial insurance companies such as MBIA or XL Capital would provide subscribers of project bonds with unconditional and irrevocable guarantees for the payment of interests and principal in the case of projects being defaulted. Since these financial insurance companies are often rated AAA, project bonds themselves would also be similarly rated. It should be noted that these financial insurance companies often require, in advance, political risk, and other partial risks to be guaranteed by other guarantee agencies such as MIGA before mono-line services are offered.

Another and typical approach is the establishment of a state development bank that specializes in the provision of long-term loans for infrastructure projects. While this is a widely accepted policy measure as seen in Philippines, China, Korea and Mexico, its performance is not particularly impressive because of the susceptibility to political pressure. Decision for the provision of a loan to a specific project tends to be influenced by political considerations rather than commercial viability of the project in question. While the establishment of a state development bank is a direct and straight-forward way of providing long term loans to infrastructure sectors, it is a costly option because of the need for the government funds to be invested as equity.

India has developed a unique system for financing infrastructure. This system is designed for facilitating refinance of debts obtained earlier from commercial banks. The government of India established the India Infrastructure Finance Company Limited

(IIFCL), which commits to "take out" earlier short/medium-term loans provided by commercial banks. If commercial banks get a prior agreement with IIFCL for the later provision of "take-out finance", these banks can offer longer-term loans by combining them with a subsequent IIFCL loan. This can be effective for mitigating the asset/liability mismatch. Another feature of the IIFCL refinancing arrangement is that the IIFCL will not conduct separate appraisals by themselves on top of the earlier appraisal conducted by the commercial banks. IIFCL will simply "take out" earlier loans, relying on the earlier appraisals made by commercial banks. This way of refinancing has enabled IIFCL to utilizes the exiting capacity of commercial banks to the fullest extent and to provide the huge amount of refinancing funds with a very small number of staff (less than 100). This appears a pragmatic approach when considered difficulty in developing necessary institutional capacity for project appraise in a short period of time. However, it should be noted that this practice of providing refinancing without its own appraisals would entail higher risks of defaults.

3.3.2 Salient Features of India's PPP

The above indicates that India has come up with a PPP system that has enabled them to minimize future obligations to pay, or to cover the losses to be incurred to the private sector in the future. Compared with the systems of other countries, India's system appears tilted in favor of the government in terms of cost burden to be shared in the future.

3.4 Analysis on India's Approach toward Vulnerabilities

This section is devoted to the substantiation of Hypothesis 2. The above exercise has identified the government oriented structure of the PPP system of India. This type of the PPP usually discourages the private sector to invest, but this did not happen in India. The following section will outline why.

3.4.1 Underlying Factors Enabling India's Approach

The analysis has identified that the following three factors have played central roles in enabling India to take the above approach.

(1) Limited Choice Available for Contractors

The government decision to introduce the PPP system for the highway sector was decisive and sweeping. The GoI decision was that, from 2005 onward, all NHs have to be developed or upgraded under the PPP scheme. This meant that the traditional public sector procurement, i.e. Item Rate Contract (IRC), was no longer available for contractors, except in those cases in which no bidders emerge for the preceding two rounds of PPP biddings. This "take it, or leave it" approach virtually eliminated possible chances for contractors to bid for the conventional IRC scheme. This means that, if the contractors wish to stay in the road construction business in the national highway segment, their only choice they have is to bid for BOT projects or to become subcontractors to bigger contractors who directly bid for BOT projects. Since implementation of the new system, together with the following measures, 80% of NHDP projects have been procured under BOT, 16%, under the annuity scheme, and just 4%, under IRC. In other words, the total of 96% of NHAI III have been processed under the PPP. Having considered a lack of readiness of the private sector in India and the size of the program, this figure of 96% is extremely high by any standard when considering the sector wide application of the PPP system for the entire national highway subsector.

(2) Fragmented Structure of Construction Industry

Participation in BOT projects requires strong financial capability since the contractors have to finance construction costs by themselves and operate the projects for a long period of time without being paid by the government. Many Indian contractors, however, do not have such capability. The construction industry in India has been highly fragmented and small in scale.

In accordance with the World Bank Report on Indian Road Construction Industry (2008), 99% of the contractors in India are family owned firms or SMEs. Among the remaining 1% (2,500 contractors), only 45-50 companies have the capacity to undertake large sized projects (The World Bank, 2008). Even for those companies, the road construction business does not necessarily offer attractive business opportunities. Profit margin of the road segment is low at around 7% (which is almost same as the inflation rate of 2008). This 7% profit margin is much lower than the case of the real estate segment that provides contractors with profit margin of around 20% (Ibid.). This indicates lesser interest toward the road segment even among these 45-50 companies.

This fragmented structure of the construction industry explains the difficulties faced by the government in implementing a large sized PPP program, but is also exactly the reason why the construction industry accepted the high-handed policy decision by the central government. The construction industry does not have strong political clout to influence decision makers and get their policy decisions reversed. The only thing they can do is to accept whatever decision is made by the central government, and adjust their businesses to new circumstances.

(3) Standardized Arrangements for Smaller Contractors

In consideration of the small-scale operations of Indian contractors, the contract package has been made smaller than other countries so as to facilitate participation by domestic contractors. As seen earlier, the average size of the NHDP III program is $156 million per project[18], which is much smaller than those of Chile ($262 million per project at 1996 price[19]) and Korea ($450 million per project[20]).

Another constraint for the participation of domestic contractors is high transaction costs associated with contract negotiations. According to The World Bank Group. (1996), the transaction cost for private infrastructure projects would amount to some 5%-10% of the project cost. This level of transaction costs would be significant cost burden for domestic contractors in India. This problem was addressed by the standardization of relevant procedures. Particularly important was the adoption of a model concession agreement (MCA). The central government does not allow any deviation from standard clauses of MCA. The only exceptions for this are technical/engineering specifications that vary from project to project. The government decision for the uniform application of MCA to all PPP projects has enabled both the government and contractors to proceed without lengthy negotiations or only with short signing ceremonies. This has resulted in major cost savings for both parties.

3.4.2 Cost Implication of India's Approach

[18] This was estimated by the author on the basis of Guidelines for Investment in Road Sector (August 2011 version) which listed 25 projects from NHDP III as possible investment opportunities.

[19] This was estimated by the author with use of data included in Annexes 3 and 4 of "Toll Road Concession: The Chilean Experience" (2001)

[20] KDI report on "Success Stories and Lessons Learned from PPP Projects in Korea), Sep. 2014, which was submitted to APEC Committee.

The above elements are effective in facilitating the participation of small/medium scale contractors into PPP projects. However, there might be an argument that the private sector participation under such strong pressure may end up later as a potential cost to the government. If many PPP projects eventually go bankrupt, the government may need to spend a lot of money to rescue failed special project companies or take over failed projects and manage them in lieu of the private operators.

This risk would be reduced by the following two reasons:

- Since 70% or more of the project costs need to be borrowed from banks, banks usually carry out intensive appraisals before extending money to the contractors. This screening would significantly reduce chances for unqualified contractors to undertake the BOT based projects.

- Even if the BOT based PPP project goes bankrupt, the government is less likely to rescue them. The government will, instead, rebid the project under the annuity scheme. With use of this scheme, the government would be able to continue the project with significant part of the risks and costs to be transferred to the private sector.

3.5 Remarks

As seen earlier, India has taken a highly standardized approach for contractual arrangements. The resultant lack of flexibility in contractual arrangements serves as a major deterrent to foreign investors. Foreign investors tend to have their own areas of concerns to be accommodated through contractual agreements. Particular areas of their concern are foreign exchange risk, political intervention and delay in handover of land to the contractors. Foreign contractors usually seek protections through incorporation of specific contractual clauses in the contract with the government to be materialized through negotiation. If the government of India were not willing to accommodate those requests, foreign contractors would simply go away from the table of negotiation.

Non-reliance on foreign contractors[21] was a conscious choice of the government of India, which has given the government a free hand for the formulation of the PPP policies without considering possible reactions of foreign investors. This has enabled the government to decide to proceed with smaller sized contractual packages for bidding and get them to apply the model concession agreement uniformly to all bidders. While this approach would entail both positive and negative aspects, it appears to have worked well in India, certainly for the NH subsector. But for other countries, this may not be the case.

In general, India's PPP policy represents a strong control orientation, which may not be recommendable to all developing countries. A best practice recommendable to developing countries would be the one which strikes a balance between the interests of the private and the public sectors. It should, however, be noted that there are cases in which this control oriented approach is justifiable. For instance, deficiency of infrastructure has been major policy agenda, but the development of PPP based infrastructure may not take off in a certain country unless a strong push comes from the government. In that case, the control oriented policy package would be justifiable. In short, the type of the PPP policy to be adopted would depend on the stage of development of the private sector. There is not a set of policy package recommendable to all developing countries. A policy package to be applied to a specific country would differ from a country to a country.

[21] India did not exclude the participation of foreign contractors. Actually, 15% of NHDP has been participated by foreign contractors, primarily from Malaysia, Russia and China. But, their policy was not developed for the purpose of attracting foreign investors.

4. In-Depth Analysis with Use of the Value for Money Assessment

4.1 Overview

The primary purpose of this Chapter is to address the third topic listed in the Research Purposes section of Chapter 1, i.e. an examination of whether the PPP system adopted for NHDP III has brought about significant cost savings to the Government in comparison with its public sector comparator. Chapter 4 starts with a review of guidelines and other documents related to the VfM methodology. This leads to the examination of the applicability of the current VfM methodology to BOT-type PPP projects. Having found that the current method of the VfM is less applicable to BOT-type PPP projects, the Chapter outlines specific modifications to the current method of VfM estimate that would be desirable. Finally, this modified version of the VfM methodology will be applied to the NHDP III to demonstrate its validity. An estimate of the magnitude of the savings attained by the adoption of the PPP modality for NHDP III will also be calculated.

4.2 Literature Review (Value for Money Methodology)

The main academic contribution the author intends to make in this Chapter is the examination of the applicability of the Value for Money Methodology to BOT-type projects and the development of recommendations for the modifications to the current method of the VfM. Since the value for money methodology has been long used as a well-established policy tool to examine the justifiability to adopt the PPP system, whether the VfM methodology is applicable to BOT type PPP projects has not been academically questioned.

It is of the author's view that, given the significant difference between unitary payment-based and BOT-based PPP projects with regard to how to compensate services, the current methodology for the VfM assessment needs to distinguish between these two. How it should be differentiated will be clarified in this Chapter. A literature review was conducted to clarify the how the current method of VfM was structured. Major findings are summarized below:

4.2.1 Genesis of the VfM Methodology

The House of Common Treasury Committee (2011) stated that in 1992 the John Major Administration launched the private finance initiative (PFI) with an aim to revitalize the UK economy through increased participation of the private sector into those areas in which the public sector was a dominant service provider. At the time of the introduction of the PFI concept, its main target was social infrastructure in which user charges are difficult to levy and thus costs need to be covered by the government. The top three sectors to which PFI was applied in UK were hospitals, colleges and schools. According to HM Treasury in 2012, among 717 projects under implementation as of March 2012, 21% were hospitals or other facilities under the jurisdiction of Department of Health, 17% were army colleges, training centers or other facilities under the jurisdiction of Department of Defense, and 14% were schools and other facilities under the jurisdiction of Department of Education (in terms of size of investments). This indicates that in the UK experience, PFI projects were primarily intended for service-oriented projects.

The House of Common Treasury Committee (2011) detailed criticism made by the Labour Party when the PFI initiative was announced. PFI was suspected to be an instrument to "circumvent departmental budgetary limitation" by off-loading debt-ridden public sector operations from the Government's balance sheet. An underlying reason for these criticisms is that, if the amounts of unitary payments are added up for the whole life of the concession, it could reach such a huge amount, that it may exceed the costs of the publicly executed projects. In the view of the critics, this is likely to happen, thus the total amount of payments needs to be closely monitored.

4.2.2 Concept of the VfM Methodology

It was against this background that the "value for money" (*VfM*) methodology was devised. The methodology was intended to provide a quantitative basis for judging whether PFI procurement would eventually cost less to the government than traditional public sector procurement. The central element of *VfM* methodology is the comparison of the whole-life cost of the PFI project against that of the publicly executed project, the latter of which is represented by the term, "public sector comparator" (PSC). A unique element of the PSC calculation is its inclusion of all *potential risks* likely to be encountered if the project is implemented under the traditional public sector procurement. In its calculation, both costs and risks of the publicly executed project are translated into a single value expressed as a net present value (NPV) of cash outflows to

be incurred for the whole period of concession (Tsukada, 2015).

The NPV of costs of public sector procurement is then compared with bid prices submitted by the private sector (which are assumed to represent the PFI costs). The difference between the NPV of the PSC and the cost of the PFI project to the government (i.e. bid price for the subsidy) is "the value for money". The value for money is the possible amount of saving to be attained if the project is executed by the private sector, rather than by the traditional public sector procurement route. More specifically, if the NPV of PFI costs is smaller than the NPV of the publicly executed project cost, then the PFI project in question is justified.

4.2.3 Variations of the Current Method of VfM Assessment

After the development of the PFI guidance by the UK government, an increasing number of countries, particularly commonwealth countries, began adopting VfM methodology for the evaluation of PPP projects/programs, together with the development of a diverse range of guidelines. It should be noted that, through this process, VfM methodology has started to be applied in a much broader manner including for PPP (BOT)-type projects. This section intends to review these guidelines in light of the issues raised above.

(1) Australia

As indicated above, the UK developed, and was the first country to employ, VfM methodology. However, the current version of UK guidance (which has replaced the earlier version of the VfM guidance of 2004) is of little value for the specific purpose of this study since it does not provide detailed methodological guidance for the calculation of the PPP costs nor PSC. Its main focus is placed on the qualitative aspects of the issues such as viability, desirability, and achievability of PFI projects.

In contrast, the Australian version of the VfM guidelines has developed further how to calculate PSC and discount rate. Because of this, the Australian version of the guidance, particularly that of the State of Victoria, has been often utilized by consultants and other professionals who have been entrusted to draft guidance. Thus, the guidelines subsequently developed by other countries have followed the principles set out by the Australian guidance. In this paper, these versions of guidelines are

collectively called mainstream guidelines.

While these mainstream guidelines have greatly contributed to the sophistication of VfM methodology originally set out by the UK Government, they mainly concentrate on how to calculate the PSC, but have paid little attention to the PPP element. The reason for this is the widely held belief that the PPP cost element is best be represented by bid prices submitted by the private sector. For instance, Partnership Victoria (2001) stated that the development of the bid price was "to be left entirely to the private sector because it is most capable of accurately estimating the costs and risks".

A problem with this mainstream method is that the government is not able to calculate VfM until the bid is submitted and opened. This is too late for policy planners who are supposed to determine what method of procurement to be employed before launching the development of infrastructure programs. In this sense the value of the mainstream guidelines is limited as a policy-planning tool.

(2) Canada

While mainstream VfM guidelines continue to put an emphasis on how to structure the PSC, a slightly different approach has emerged with increased attention toward how to structure the PPP costs. The notable example is the guideline issued by Infrastructure Ontario, an agency of the Provincial Government of Ontario, Canada. It introduced in 2007 the concept of "adjusted shadow bid" (ASB) for PPP pricing. Its approach was to estimate a bid price by adding up the major cost elements of the PPP project. More specifically, the ASB is constructed by summing: (i) construction costs; (ii) operation costs; (iii) financing costs; (iv) profit margin; (v) retained risk, and ancillary costs, which is very close to the practice of the private sector.

Ontario's approach indicates that ASB be used in estimating the VfM until the bid is submitted. Once the bid is submitted, "the shadow bid is replaced by the preferred bid" (Infrastructure Ontario, 2007, P. 6). The preferred bid means "the lowest evaluated and substantially responsive bid" submitted to the procuring authority in time. This indicates that Infrastructure Ontario distinguishes two stages, (i) planning stage and (ii) bidding stage, when estimating the PPP cost. This approach enables VfM methodology to be used as a planning tool. While the Ontario approach has resolved this problem, there is still a remaining issue. It does not explicitly refer to the handling of future revenue,

which is a critically important element for BOT type projects.

(3) India

India has not yet officially adopted the VfM approach, but they have started to use the VfM methodology as a part of staff training. A comprehensive model was developed for this purpose in 2011 by Economic Consulting Associates, UK, in cooperation with CRISIL, under the auspice of the Ministry of Finance, the Government of India[22] (which is called hereinafter Indian Model).

Salient features of Indian Model include: (i) the estimate of PPP costs from individual cost elements[23]; (ii) the explicit inclusion of financing costs for the calculation of both PPP and PSC costs; and (iii) the detailed estimate of future revenue flow for both PPP and PSC costs. This Model is custom-designed for the PPP system in India, which is primarily based on the viability gap funding system, and supplemented by the annuity scheme. This Indian Model appears to be the closest representation of the practices of the private sector in terms of shadow bid pricing for PPP (BOT) type projects.

4.3 Proposed Modifications to the Current VfM Methodology

The basic problem with the application of the current VfM methodology to BOT type projects stems from the difference in structure between the unitary payment type and BOT type projects. Under the unitary payment type project, all costs of development and operation are covered by the government in the form of periodic payments made annually or semi-annually during the entire period of operation. Because of this structure, it is critically important for the government to estimate the entire amount of payments to be made for the entire project-life and make sure that that costs to be paid to the private sector not exceed the total amount of payments expected to be incurred under the traditional public sector procurement. The VfM methodology has been devised exactly for this purpose, i.e., the comparison in the amounts of payments to be made by the government between these two procurement methods.

However, in the case of the BOT type project, a major part of the costs are covered by

22 Viability analysis model for PPP projects (Road Sector), Version 5.2, 27 June, 2011, Department of Economic Affairs, MoF

23 Shadow bid pricing approach has been reflected in the financial planning sub-model in ECA/CRISIL Model.

the private sector with its future revenue flow to be raised from user charges. The remaining part of the project cost is covered by the government in the form of capital subsidy, or a Viability Gap Fund. Under such an arrangement, the important part of the calculation is the estimate of future revenue, together with that of how much deficiency exists between the future revenue and the PPP project costs, the latter of which has to be paid by the government. The current method of the VfM does not explicitly require the estimate of these future revenues to be raised by the private sector.

There is another important cost element to be explicitly taken into account in the case of the BOT based project execution, which is the cost of financing. For infrastructure projects, the financing cost often accounts for the second or third largest part of the costs. This indicates the obvious needs of explicit calculation of financing cost for the BOT type project. However, the current mainstream guidance for VfM is silent on this element.

Another missing element under the mainstream guidance is the return of investment. One of the major justifications of the PPP approach is the transfer of commercial risks from the public to the private sector. Assumption of additional risks by the private sector is reflected by the higher return on investment as a compensation for higher uncertainties to be assumed by the private sector. Thus, if the VfM methodology is to be applied to the BOT type projects, these essential elements of BOT-type projects should be explicitly included in the calculation of VfM.

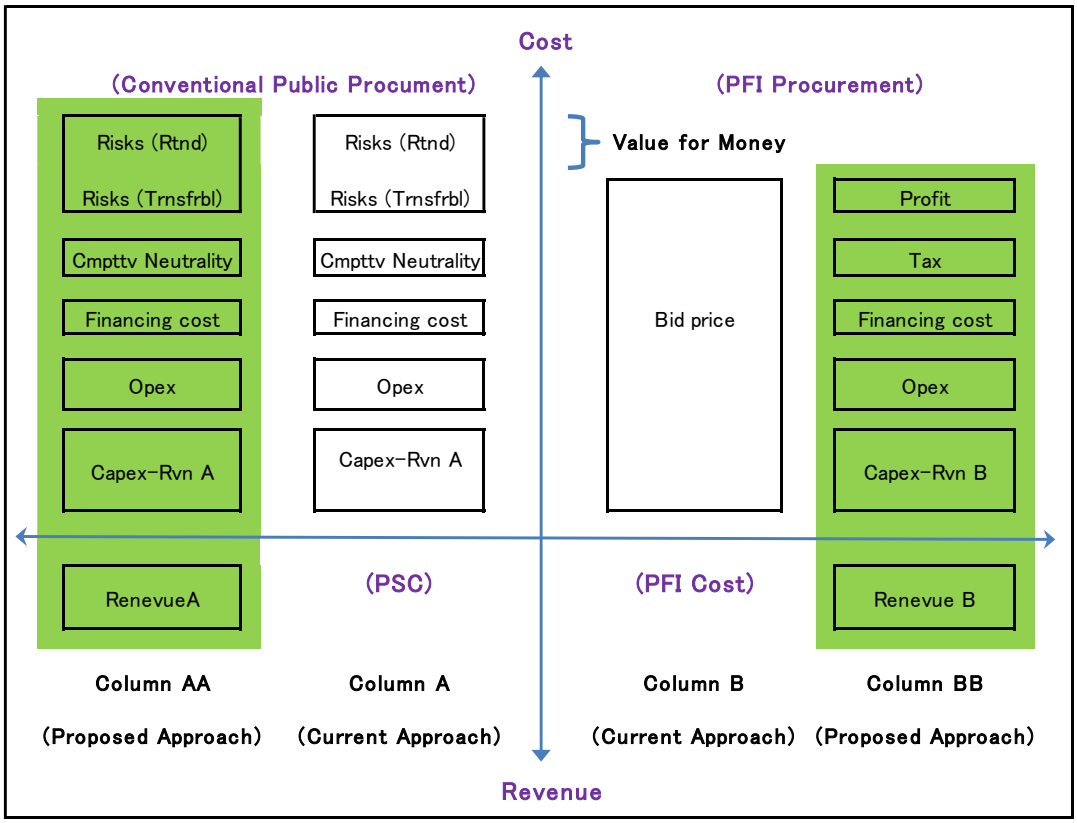
However, the current guidance of the VfM methodology discourages the granting authorities to estimate those bid prices to be submitted by the private sector for the BOT type PPP projects. The reason for this is that the estimate of the bid prices for PPP (BOT) projects should be entirely left to the private sector. Since competitive bidding is essentially designed for soliciting the private sector to submit the lowest possible bid prices, the public sector should not guesstimate bid prices that are competitively determined.

While this is valid in approach, it causes a procedural problem. If this approach is taken, the value for money for a PPP project would not be estimated until the private sector submits bids. This means that the government has to decide whether they will adopt PPP scheme without having the information of value for money. In a real world situation, a selection of the procurement method has to be made at the planning stage.

Therefore, in order to make the VfM methodology a useful planning tool, the policy planner should be allowed to make a guesstimate of the bid price likely to be submitted by the private sector at an early stage of planning of the PPP program. In other words, shadow pricing should be incorporated in the reformulated version of VfM methodology.

Summing up the above arguments, the following elements should be incorporated in the current VfM methodology in order to make VfM methodology effective as a BOT-type PPP planning tool. The proposed scheme of modification of the VfM methodology is illustrated in Figure 8 (Tsukada, 2014).

(i) a shadow bid pricing in the calculation of the net costs of PPP;
(ii) incorporation of financing costs for both PPP and PSC;
(iii) incorporation of revenue streams for both PPP and PSC; and
(iv) incorporation of premium or return on investment for PPP.



Source: Tsukada (2014)

Figure 8: Comparison between Current and Proposed VfM Methodology

Having set forth the proposed structure for a reformulated VfM methodology, this section details what is to be included in each item of the cost components. Since this reformulated model is based on the shadow bid pricing approach, the PPP portion of the calculation should be replaced when an actual bid price is eventually obtained.

For Capex: Capital expenditure usually consists of: (i) design and development cost; (ii) civil construction cost; (iii) contingency; and (iv) insurance. Unless compelling reasons exist for differentiation, capital expenditure should be identical between the PSC and PPP cost estimates.

For Opex; Operating expenditure usually consists of, in the case of highways, (i) periodic maintenance (often every five years in the case of blacktop roads); (ii) routine maintenance (to be incurred every year); (iii) toll collection expenses; (iv) electricity and other utilities; and (v) patrolling expenses. Similar to the case of Capex, operating expenditure should be identical between the PSC and PPP estimates unless some justifiable reason exists for differentiation.

Revenue: In contrast to cases of unitary payment or annuity concession schemes, for the cases of BOT or PPP (BOT), the revenue is the most critical element of the whole undertaking. Obviously the primary source of revenue is tolls. In spite of this, the mainstream guidelines do not list the revenue as an explicit item for the VfM calculation, nor indicate how toll revenue should be estimated for the future.

Under the reformulated version of the VfM methodology, the revenue is listed as a separate item for the VfM calculation. Regarding the method for estimating the revenue, it should start with the demand forecast. It should also be supplemented by information on the level of tolls and the frequency of toll increases. In principle, the estimated amount of revenue should be the same for both PSC and PPP, but it can be different if the data on revenue leakage and frequency on the toll increases differ between public sector and private sector operations.

The above sharply contrasts with the case of unitary payments or annuity payment schemes. In those cases, user charges may be collected by the concessionaire, but those are passed on to the granting authority. In a limited occasion, user charges are collected and retained by the concessionaires. In that case, the revenue is referred to as “third

party revenue", but no guidance exists on how to estimate third party revenue because of its negligible importance.

Financing cost: Since the cost of financing is a major cost element in the case of BOT or PPP (BOT), it should be explicitly listed for the calculation of PPP costs. It should include: (i) interest payments to be paid during the whole period of borrowing principal; and (ii) interest payments during construction. The cost of financing should occur not only for PPP elements, but also for PSC elements. In the latter case, it is recommended financing costs be included since PSC entails an opportunity cost. Allocation of the money to one specific project or specific sector means denial of the allocation of the fund to other project(s) or to other sector(s). In the case of the PSC, the interest rate can be estimated from that of the government security or government bond of equivalent maturity.

Competitive neutrality: Private sector usually needs to pay a variety of taxes including corporate income tax, land tax, stamp duty etc. However, the public sector may be exempted from paying similar taxes. Thus direct comparison between PPP and PSC costs may lead to the comparison advantageous toward the public sector. To adjust this bias, the PSC is assumed to have paid the similar taxes and other payments so that PSC costs are to be compared on an equal-footing basis.

Risks: If the project is carried out under the public sector procurement, it may entail several additional costs (risks). These should be included in the calculation of PSC costs. Typical hypothetical costs to be included in the PSC costs are: (i) construction cost overrun; (ii) construction time overrun; (iii) operating cost overrun; (iv) traffic shortfall; and (v) revenue leakage. These risks should be counted only for the PSC cost. Usually the costs of those risks would be estimated through the interview to experts ("risk workshop") about the probability of risk occurring, and the magnitude of the costs when these risk events have taken place. Furthermore, risks are classified into transferable and retained risks. In general practice, the retained risks are factored in the calculation of PSC and PPP costs for the sake of attaining "like with like" comparison[24].

Premium/profit: Under the PPP, transferable risks should be shifted from the public to the private sector. Assumption of additional risks should be rewarded in the form of

24 To this practice, the author has some reservation when private bid is shadow priced. When shadow pricing is to estimate the bid price to be submitted by the private sector, the retained risks should not be included in the PPP cost.

premium of the PPP cost, or by higher profit. Obviously premium or profit should be included only for the PPP cost elements.

4.4 Application of the Modified VfM Methodology to NHDP III

When the Government decided to employ a PPP procurement method for the NH subsector, there was concern that it might be premature to let the private sector cover all segments of the NH network. Given the fact that a significant portion of the NH network is thinly trafficked and remotely located, it was worried that NHDP III would not be delivered in time unless the traditional public sector procurement method was deployed to cover less viable portions of the system. In spite of these concerns, the government decided to apply PPP (BOT) to all segments of the NH network. Presently, having reached the final stage of NHDP III implementation, it is worthwhile to revisit this issue and examine, in a retroactive manner, whether the earlier government decision was correct with use of data accumulated to date through the implementation of the NHDP III.

To conduct this analysis, the author initially intended to use a cash flow model developed by Deloitte Touche India with necessary modification to be added by the author so as to make it usable for the calculation of the Value for Money. However, the author later found that the Indian Model fulfills all requirements set out by the modified version of the VfM in Section 4.3.

The reason for this compatibility of the Indian Model with the modified version of the VfM method is that Indian Model was designed for the operation of NHAI. Different from the usual public sector, NHAI mobilizes the fund from capital markets by issuing NHAI bonds. Therefore, NHAI is concerned about the costs of financing, which was obviously included in the Indian Model. In addition, NHAI collects tolls as revenue, and thus revenue would constitute another important element for NHAI, which is again included in the Indian Model as a net cost of PSC. Because of these reasons, the Indian Model reflects the key elements of the modified version of the VfM methodology as described in Section 4.2.3 (3).

Furthermore, it has incorporated specific requirements of the model concession agreement for PPP (BOT) including a detailed formula for disbursing VGF and partial indexation, together with favorable tax treatments accorded to the NH subsector. Since

Indian Model was custom-designed for India's PPP (BOT) scheme, the author decided to use this Model for the calculation of Value for Money of the NHDP III.

In order to calculate the VfM for NHDP III, the following specific tasks will be carried out in sequence:

- Development of "a representative project" for NHDP III
- Cash flow analysis to estimate the PPP cost for the representative project
- Estimate of the cost of the public sector comparator (PSC) for the representative project
- Calculation of the value for money for the representative project
- Robustness check of the value for money thus calculated

4.4.1 Development of a Representative Project for NHDP III

Having determined a model to be employed for addressing the earlier question, the first task to be carried out is to construct "a representative project" that reflects the main features of NHDP III in a reasonably accurate manner. This part of the exercise was primarily intended to collect the necessary data to be inputted to Indian Model.

Those input data have been obtained by calculating a mean value of 100 projects consisting of NHDP III (See Appendix 5 for the distribution of road length of these projects). One of the reasons why a representative project needs to be developed is the fact that NHDP III is still underway and thus the entire program data is not yet available. To answer the above specific question on the validity of the earlier government decision, this representative project approach provides a reasonably robust basis for judgement.

To gather the data needed for constructing a representative project, the author conducted a field visit to India in September 2013 and visited NHAI. The Authority kindly agreed to provide necessary data[25]. The following are data provided by NHAI with regard to key attributes of the representative project for NHDP III.

- Average length of projects of NHDP III: 92km[26]

[25] The data was obtained from Chief General Manager of NHAI, Mr. G. Suresh, a co-researcher for this research with support of his subordinates.
[26] An average length of 100 projects under implementation as of September 2013 for NHDP III

- Concession period: 20 years
- Construction cost per km: Rp. 92.4 million per km[27]
- Viability gap fund provided to the representative project: 30% of the total project cost[28]
- Annual Average Daily Traffic: 20,819 vehicles per day[29]

During the field visit, relevant financial data were also obtained through interviews with experts of MoF, India Resident Mission of Asian Development Bank, and Deloitte Touche India. Key information related to the structure of a typical special purpose company is as follows:

- Equity investment: 30% of the total capital expenditure
- Interest rate for the long term loan for the private borrower: 11.0-14.0 % per year (in our analysis, the average of these two interests of 12.5% was used as an input for the model)
- Interest rate for the government bond of 10 years: 8% per year
- Expected rate of dividend for shareholders: 15% per year
- Pace of price escalation (inflation): 5% per year

4.4.2 Estimate of the PPP Net-costs of the Representative Project

Based on the above data sets, a cash flow analysis was conducted to calculate the net present value (NPV) of the PPP based development of the representative project. Key steps following in this analysis are described below in sequence.

(1) Demand forecast

The first year traffic level obtained from NHAI was inputted to the Indian Model, which is broken-down into traffic level of each type of vehicles with use of the default value of the Model. Default values were also used for the annual growth rates of individual vehicles (See Table 2). With input of these data, Indian Model produced the traffic

[27] Among the above 100 projects, 29 were completed projects, whose construction costs are thus available. This figure is the average cost per km of these 29 projects.
[28] Among the above 100 projects, 60 projects were awarded with VGF (the rest of which are either negative grant, annuity or item rate contract). This figure is the average value of VGF of these 60 projects.
[29] The calculation of the average daily traffic requires a vehicle-by-vehicle breakdown. Among the above 60 projects, only 11 projects have detailed data consistently collected. This figure is the average daily traffic of those 11 projects.

forecast as shown by Figure 9. This Figure indicates that the traffic will grow at 5% at the first four years, and then the speed of growth would slow to 4% for the subsequent 3 years and then to 3% for the remaining years of operation. This declining speed of growth is in line with general practices of demand forecasting.

Table 2: Base year Traffic and Subsequent Annual Growth Rate

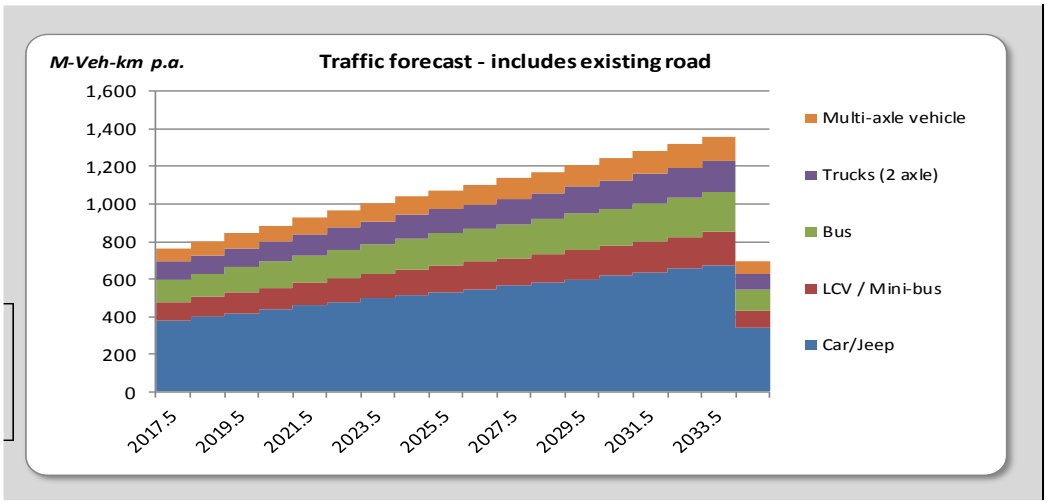
Level of Traffic in Base Year of 2015

	Base year vehicle km	Annual Average Daily Traffic
Car/Jeep	347,116,460	10,337
LCV / Mini-bus	91,337,600	2,720
Bus	111,116,220	3,309
Trucks (2 axle)	83,144,080	2,476
Multi-axle vehicle	66,354,080	1,976
Total	699,068,440	20,818

Annual growth rate of traffic

Starting year	2017.5	2021.5	2024.5
Car/Jeep	5%	4%	3%
LCV / Mini-bus	5%	4%	3%
Bus	5%	4%	3%
Trucks (2 axle)	5%	4%	3%
Multi-axle vehicle	5%	4%	3%

Source: Indian Model developed by Economic Consulting Associates under the auspice of DEA, MoF, GoI



Reprinted from Indian Model Developed by ECA

Figure 9: Traffic Forecast for the Representative Project

(2) Cost of the PPP based representative project

Based on the data obtained during NHAI, Indian Model has come up with the estimate of costs of civil construction and the total capital expenditure, each of which is estimated at Rp. 9.84 billion and Rp. 10.65 billion, respectively. Similarly, Indian Model has come up with the estimate of Rp. 0.11 billion for routine maintenance costs per year, and Rp. 0.98 billion for periodic maintenance which takes place every 5 years. The Model has produced the estimate of the financing cost of the 10 year loan is Rp. 0.56 billion, and interest during construction (IDC) is Rp. 0.29 billion. Main cost data are listed below.

Capital Expenditure (Rp. Million)

Design & Development	197
Civil construction	9,841
Contingecy (5% of capex)	502
Insurance	110
Total capital expenditure	10,650

Annual Operating Costs (Rp. Thousand)

Routine maintenance	87	Rp. 000 /Km/Lane
Toll collection expenses (2 Plazas)	7,240	Rp. 000 /Plaza
Other office expenses	11,580	Rp. 000
Patrolling expenses	30	Rp. 000 /Km
Electricity expenses	30	Rp. 000 /Km

N.B. 4 lanes, 3 toll plaza per a represenative project

Additional Operating Costs per every 5 years (Rp. Thousand)

Major maintenance per every 5 years	2,670 Rp. 000 /Km/Lane

Financial Cost Parameters

VGF grant as % of capex	30.0%
Equiity % over capex	30.0%
Debts % over capex	40.0%
Cost of equity	15.0%
Cost of 10 year loan	12.5%
Cost of loan during construction	12.5%
Weighted average cost of captial	7.9%

Weighted Average Cost of Capital (Real)

	Equity	Grant	Loan
Weight	30.0%	30.0%	40.0%
Cost of funds	15.0%	0.0%	12.5%
Tax	0.0%	0.0%	33.2%
Tax adjusted cost	15.0%	0.0%	8.6%
Weight/tax adjusted cost	4.5%	0.0%	3.4%
WACC (Real)	7.9%		

Financing Cost (Rp. Million)

Financing cost of 10 yr loan	564
Interest during construction	293

Source: Indian Model developed by ECA under auspice of DEA, MoF, GoI

(3) Revenue

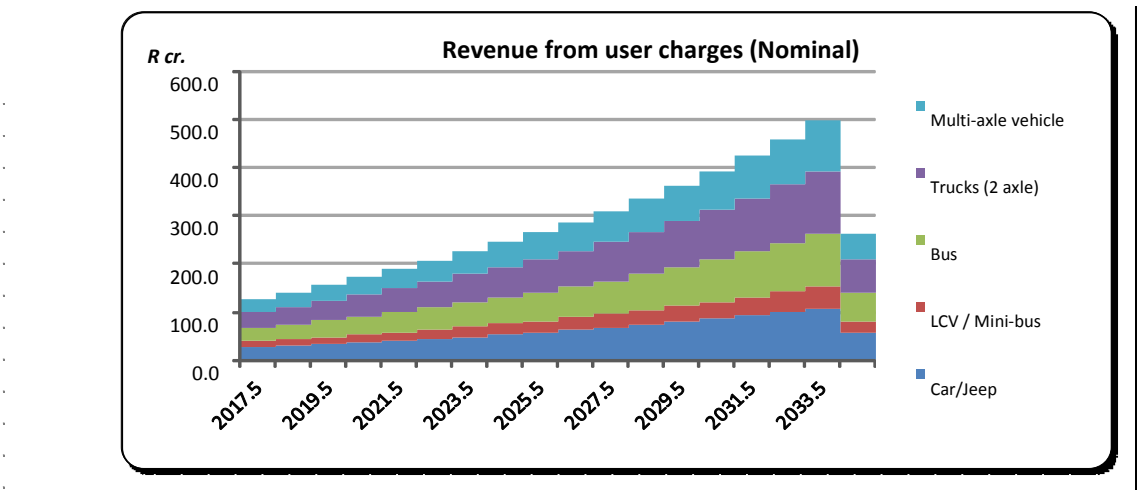
Indian Model estimated the revenue with use of the basic traffic data obtained from NHAI together with use of the default value of user charges. In the calculation of the revenue, the rates of user charges were assumed to increase every year at the rate of 40% of the whole-sale price index (WPI) in line with the model concession agreement. WPI is assumed to increase by 5% every year.

User charges as of 2017.5

Types of vehicles	Rupees per veh per km
Car/Jeep	0.65
LCV / Mini-bus	1.05
Bus	2.20
Trucks (2 axle)	3.45
Multi-axle vehicle	3.45

Source: ECA

Based on the above data sets, the Indian Model has come up with the estimate of the future revenue flow as illustrated in Figure 10.



Reprinted from Indian Model Developed by ECA

Figure 10: Revenue Forecast for the Representative Project

Figure 10 indicates the faster speed of growth in revenue than that of the traffic which is due to the 2% annual toll increase.

(4) Cash Flow for the Entire Concession Period

Integrating the above sets of data and information, Indian Model has come up with the estimate of cash flow (nominal) as illustrated in Figure 11.

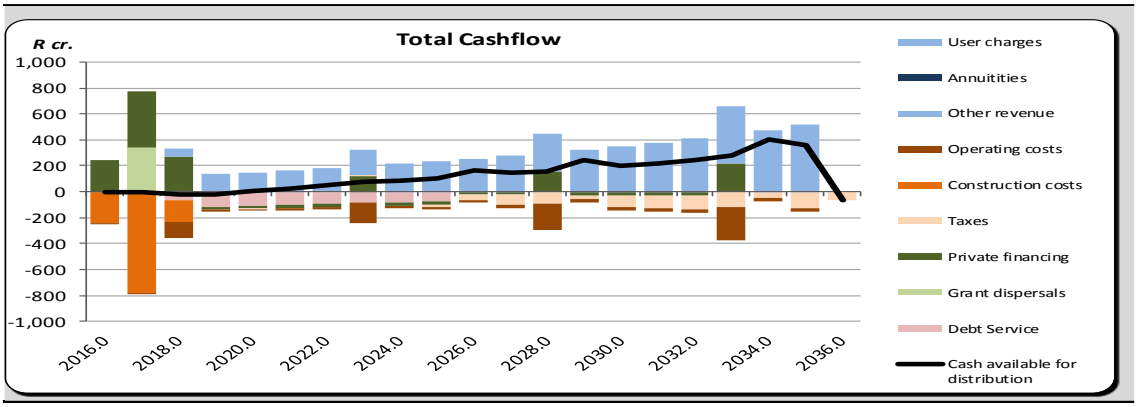


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Figure 11: Cash flow of PPP Based Development of Representative Project

Based on the above cash flow, the project internal rate of return (IRR) is estimated by Indian Model at 12.5%, while the equity IRR is estimated at 11.4%. Net present value of the representative project is similarly estimated to be Rp. 141 million, which was estimated using the weighted average cost of capital (WACC) (13.7%) as a discount rate.

4.4.3 Estimate of the Net Cost of the Public Sector Comparator

Having conducted a cash flow analysis for the PPP, the next task is to estimate the public sector comparator (PSC) for the representative project. The estimate of costs and revenue of PSC follows processes similar to those of the PPP. However, there is a major difference between the two since PSC include the potential costs of risks associated with the public sector execution of the project. The Model lists several specific risks, which are: (i) construction cost overrun; (ii) construction time overrun; (iii) shortfall in traffic; (iv) toll collection leakage (revenue shortfall due to leakage); and (v) higher opex costs.

Among these risks, the two greatest risks are construction cost overrun and time overrun. Ramkrishnan and Raghuram (2012) provided the values of these risks based on earlier experiences of NHDP I and II, and are listed below.

- Average cost overrun of the traditional public sector execution is 30.4% over the contracted price of the project
- Average time overrun is 16.48 months, which correspond to the 55% deviation from the originally planned construction period.

For the rest of the risks, default values of the Indian Model were used. With these values for each of the potential risks, together with the cost and revenue data, the NPV of the PSC was calculated by the Indian Model at Rp. 8,164 million with use of the interest rate of the government security (8%) as a discount rate.

4.4.4 Estimate of the Value for Money of the Introduction of the PPP

Based on the above calculation, the value for money for the above representative project was calculated as the difference in costs to the government between the PPP and PSC

routes. The Indian Model conducted this calculation whose results were illustrated in Table 3.

Table 3: Calculation of the Value for Money for the Representative Project

Present value inputs are calculated using cashflows provided by the Financial Viability Indicator tool, discounted at the user-input discount rate.

All calculations should be made in nominal terms.

Cash costs and receipts - from Financial Viability Indicator tool		*PSB*		*PPP*
PV of payments for a public sector project	*R cr.*	1,637.8		
PV of payments under PPP	*R cr.*			312.9
Total costs for public finances	*R cr.*	1,637.8		312.9
Gross VAT received	*R cr.*	0.0		0.0
Corporate tax (including MAT) received	*R cr.*			267.9
Third party income (eg, tolls, charges, advertising) received	*R cr.*	1,881.5		
Total receipts for public finances	*R cr.*	1,881.5		267.9
Net cash cost to Public Finances (= costs - receipts)	*R cr.*	-243.6		45.0

Risk adjustment		*PSB*		*PPP*
Expected value of risk that would be transferred under PPP	*R cr.*	**1,060.0**		
Expected cost of added risks from a PPP for the public sector	*R cr.*			**15.9**
Adjusted net cost to Public Finances	***R cr.***	**816.4**		**29.2**
Expected average VFM	***R cr.***			**787.2**

N.B. PSB refers to Public Sector Benchmark, equivalent to PSC

Reprinted from Indian Model developed by ECA

As indicated in Table 3 above, the costs to the government of the PPP route have been estimated to be Rp. 292 million. Since the NPV of the PSC is Rp. 8,164 million, the VfM for the representative project is estimated at Rp. 7,872 million, 48.1% of the project costs, which is a significantly large and positive VfM.

4.4.5 Examination of the Robustness of Estimated VfM

Since the above VfM is a "point estimate", it is desirable to find the possible range of deviation from this point estimate in accordance with a variety of possible risk scenarios. Typically this is done using sensitivity analysis. However, sensitivity analysis is less effective in simulating a real world situation because of a single scenario approach for the occurrence of risks. Since individual risk events are likely to occur simultaneously with varying degrees of impact, a Monte Carlo Simulation model was used. This requires, as prerequisites, the provision of the mean value of individual risks and their probability distributions. The following are the mean value for individual risks to be

applied for NHDP III and standard deviation assuming that those risks would occur in accordance with the normal distribution (Table 4). The mean values of cost overrun and time overrun were obtained from Ramakrishnan & Raghuram (2012), while other values were obtained from default values of Indian Model.

Table 4: Mean Values of Risks and their Probability Distribution

Potential risks	Mean	Standard deviation
Cost overrun (NB)	30% higher than construction cost estimate	10% of construction cost
Time overrun (NB)	55% longer than 30 months	10% of 30 months
Traffic shortfall	23% lower than original traffic forecast	10% of original traffic forecast
Revenue leakage	15% of original revenue estimate	5% of original estimate
Operating expenditure	15% higher than original opex estimate	5% of estimated opex

NB 1: Values of the mean for cost overrun and time overrun were basedon Ramkrishnan and Raghuram (2012)

NB 2: Other values are based on the default values of Indian Model

Based on the above data, Indian Model conducted Monte Carlo Simulation, whose results are illustrated in Figure 12.

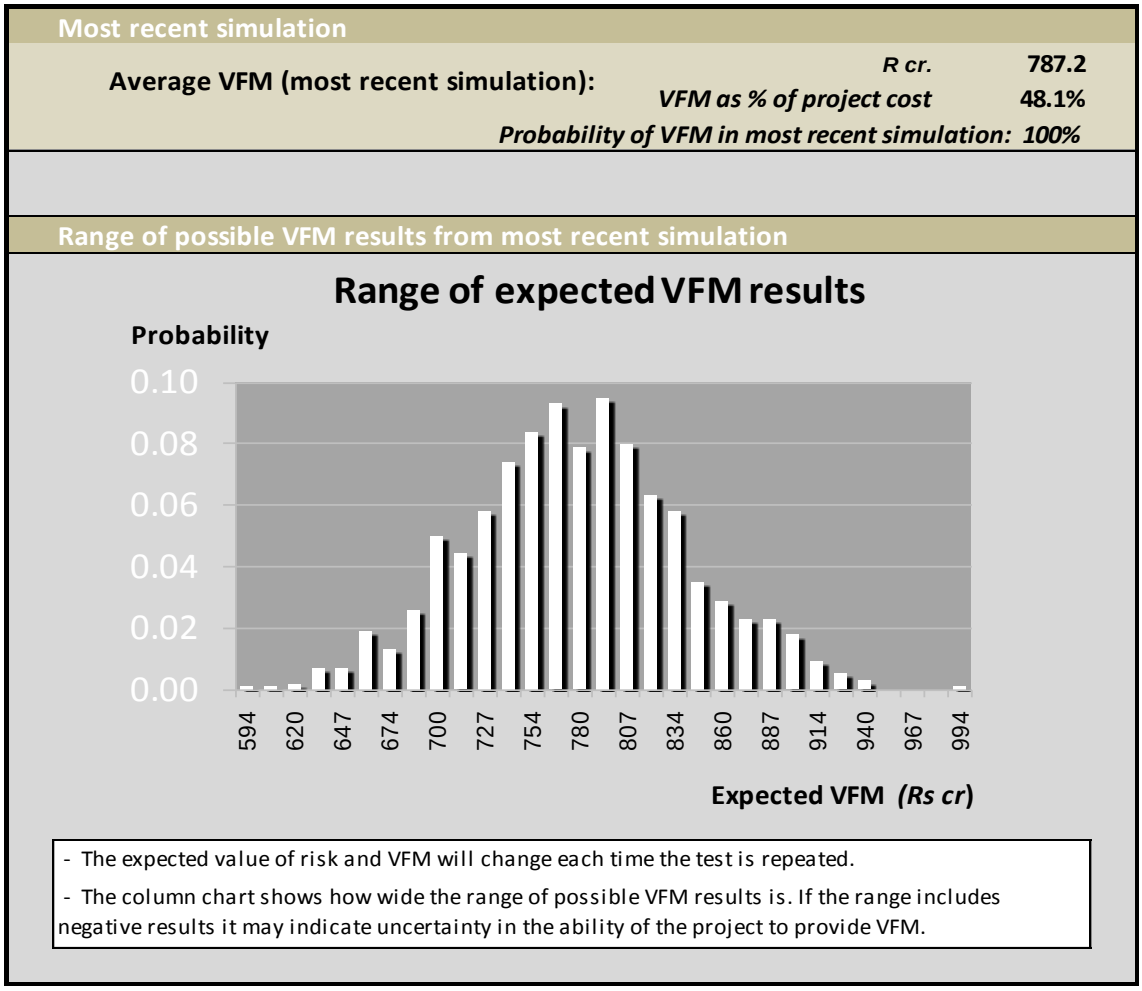

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Figure 12: Monte Carlo Simulation for Range of variation of VfM

Figure 12 indicates that all of the VfM simulations fall under the positive zone with a relatively narrow range of variation, indicating the robustness of the current estimate of the VfM.

4.4.6 Findings of the VfM Assessment

The above analysis indicates that the selection of the PPP has brought about positive value for money for almost all possible risk scenarios. This confirms that the earlier decision of the government for the selection of PPP in lieu of the traditional public sector procurement was correct.

4. 5 Remarks

Since the inception of PPP, the procurement method has undergone significant change. Despite this change, the *VfM* methodology for evaluating a PPP project has not changed much in the last two decades. Because BOT- type projects depend much less on a government subsidy when compared to a unitary payment type projects, the current *VfM* methodology was found to be less applicable for a BOT type project. A proposed modification to the VfM methodology is an attempt to make the VfM methodology more relevant to the current mainstream method of procurement, i.e. BOT based PPP.

The proposed modification of the VfM methodology contributes to making the methodology more useful as a planning tool for PPP programs. Under the earlier method of calculation, the procurement plan is not able to be finalized until the bid price is submitted by the private sector, but under this modified version of the VfM approach, a shadow bid price can be estimated. This enables procuring agencies to plan ahead before undertaking PPP programs.

The analysis above shows large and positive Value for Money for the representative project of NHDP III, indicating that the PPP net costs for the representative project to the government are much smaller than those of the net costs of the public sector. This indicates that the earlier government decision to proceed with PPP in a full-fledged manner for NHDP III has shown to be correct.

5. Conclusion

5.1 Overview

Following the above three-pronged analysis on the PPP issues of India with particular emphasis on the NH subsector, this Chapter intends to highlight key findings and draw lessons from the experiences of implementing the NHDP III. The Chapter consists of: (i) summary of research findings; (ii) implication of the Research; (iii) theoretical contributions; and (iv) limitation of the Research.

5.2 Summary of Research Findings

Faced with urgent needs for developing a large-scale highway network, an increasing number of developing countries are resorting to PPP schemes to be implemented in a programmatic manner. Launching a PPP program requires, as prerequisites, three questions to be answered in advance: (i) deliverability of the PPP program under the specific circumstances of the government; (ii) readiness of the private sector for undertaking PPP programs; and (iii) achievability of cost savings by the adoption of the PPP in lieu of the traditional public sector procurement.

These three interrelated questions are addressed in the context of NHDP III, more specifically in such a manner to answer to three Research Questions set out at the outset of the dissertation.

(1) Deliverability of PPP Programs

India has come up with robust arrangements through the establishment of a PPP Appraisal Committee headed by two powerful coordinating agencies (PC and MoF) with necessary budgetary backup. In addition, the GoI has designated NHAI as an executing agency, which is well known for its capacity to deliver. These arrangements appear to assure the smooth implementation of NHDP III. But, the effectiveness of these arrangements has been undermined by institutional frictions and a subsequent human X factor.

Politically assigned ministers often wish to exert their influence over the operations of the sectors under his/her portfolio. But, this sort of intrusion by ministers is typically

rebuffed by a glass-wall of resistance of bureaucrats. But, if there exist serious institutional frictions in the government, an intrusion may happen. Unfortunately, this is the case for NHDP III.

NHAI has an impressive track record of delivering the large-scale NH development programs. This was thanks to the managerial autonomy accorded to NHAI, which has enabled NHAI to keep MoRTH away from their operations. However, under the newly created PPP system, MoRTH was given authority to prescreen all NHAI applications for PPP projects before being submitted to the PPP Appraisal committee. This new function has created an opportunity for MoRTH to intervene in the operations of NHAI.

The then Minister of MoRTH was quick to seize this opportunity for strengthening his influence over the operations of NHAI. Intervention by the Minister was intrusive enough to slow down the process of implementation of NHDP III. Once delay has happened, it has triggered chain reactions of delay, which was resulted in such a major delay.

But, once getting into mid 2009 when new Minister was assigned, the pace of processing suddenly picked up again. Actually the new Ministry[30] was well known for his result orientation. Upon his assignment, he set a clear target for the delivery of the entire NHAI operations. This has resulted in immediate improvement in the pace of processing. This indicates that the human X factor can work both ways, negative and positive directions. This recovery of processing represents a good example of the latter case.

One problem of PPP is that it carries an intrinsic risk of inviting interventions by politicians. Since PPP provides significant subsidies and other supports to the private sector, PPP give decision makers rent-seeking opportunities. This tends to attract the attention of, and intervention by, politicians. The policy planners should be aware of this type of risk, and are encouraged to institute precautionary measures that make political interventions difficult. Possible measures include the replacement of a decision making process by an individual officer with a collective decision making system taking a form of committee.

[30] The Initial of the new minister for MoRTH is K.N. Before assuming this position, he served as a Minister for Environment and Forestry, and then as a Minister for Commerce and Industry. His constituency is in Madhya Pradesh.

(2) Readiness of the Private Sector to Undertake Large-scale PPP Programs

The type of PPP chosen by GoI was BOT based. Under this form of PPP, contractors have to finance the costs of development by themselves. In addition, they have to operate facilities for 20 years or more. These obligations are a tremendous burden for the construction industry of India, an industry that is highly fragmented in structure. It appeared that the Indian construction industry was not yet ready for taking on such a huge scale PPP program.

Cognizant of this problem, the Government of India came up with several measures to facilitate the participation of domestic contractors in the PPP business. Contract size was made much smaller so that smaller contractors could be qualified for bids and then manage the projects. A concession agreement for PPP was also standardized so as to minimize transaction costs associated with contract negotiations.

While these measures have certainly facilitated the participation of domestic contractors to the PPP, they were still hesitant to participate. Having noted this hesitation, the Government took another, and different, type of action. When introducing the PPP to the NH subsector, the Government shut all doors for contractors to escape from PPP to traditional IRC contracts. GoI's decision was that all NH projects to be procured from 2005 onward would be PPP-based. If domestic contractors wished to stay in the road construction business, they did not have any other choice beside bidding for PPP projects, or becoming sub-contractors for other bigger contractors.

The combination of these soft-liner and hard-liner approaches has enabled the GoI to secure private sector participation in its PPP program. It should, however, be noted that one of the underlying factors which has enabled the GoI to take such a drastic action was the fact that India does not depend on foreign investors for delivering PPP programs. These foreign investors are often choosy about countries in which to invest. If their demands are not met, they will simply walk away from negotiation and move to other countries. The Government of India does not need to worry about those possible reactions from foreign investors, which has given the GoI a freer hand for developing their own version of the policy measures.

(3) Achievability of Cost Savings by the Adoption of the PPP

Seeing apparent benefits of the PPP, governments of developing countries tend to jump into PPP without conducting a quantitative analysis. India is not an exception to this tendency. They decided to introduce the PPP scheme without carrying out any quantitative analysis. Having noted this decision making process of the GoI, the author has conducted a VfM assessment in a retroactive manner so as to examine whether the earlier government decision to introduce PPP to NH subsector was beneficial.

Having conducted a VfM assessment for NHDP III with use of its modified version, it was confirmed that the adoption of the PPP scheme has brought about significant savings to the Government. This, in turn, indicates thus the earlier GoI decision to adopt the PPP system was correct.

5.3 Implication of the Research

PPP tends to be discussed from the perspective of the private sector. Its validity has often been evaluated by the acceptability of the PPP for the private sector, more specifically, from the viewpoint of whether the PPP structure is accommodating enough for the requests of private investors. While this approach is certainly important, we should not lose sight of the other side of the issue, which is the cost implication of investor-oriented policy measures. This dissertation has focused on this side of the issue, which has rarely been studied.

Faced with severe budgetary constraints, many developing countries tend to be overly enthusiastic to get private investors to participate in infrastructure development. This enthusiasm has often resulted in offering excessively lucrative incentives to the private sector. The Mexican BOT program of the 1990s provides a good illustration of this tendency. Pressed by the President Office, the Mexican government adopted a kind of BOT scheme overly concessionary to the private sector[31]. The result was a huge bailout extended to the private sector, which amounted to more than half of the originally estimated program cost (US$7 billion bailout for the US$12 billion highway development program). This clearly indicates the potential magnitude of fiscal burden to be born by the government in future by providing guarantee and other forms of fiscal incentives.

[31] Selection criterion having been set as a shortest period of concession as requested by construction industry

The real challenge facing developing countries is how to secure private sector participation in infrastructure development without offering overly generous terms. India's experience has clearly demonstrated that it is possible for developing countries to secure private sector participation under the framework of PPP, without offering excessively lucrative incentives.

It should, however, be noted that the example shown by the Indian experience is applicable only to those countries who can meet the following criteria:

- ✓ Strong Institutional Capacity of the Government: Since the government is a central player for the entire process of PPP projects, the government should have strong policy planning capability. Particularly important is the capacity to address specific needs of relevant sectors in a flexible and responsive manner so as to create an operational environment conducive to the participation of fragile domestic contractors and other relevant industries.

- ✓ Strong Managerial and Financing Capability of the Private Sector: Different from the traditional Item-Rate-Contract, BOT developers have to finance construction/operation by themselves and commit themselves to long-term operations. This requires relatively strong managerial and financing capability of the construction and other relevant industries.

- ✓ Affordability of User Charges: Since the main sources of revenue for BOT/PPP projects are user charges, the general public should be affluent enough to pay market-based user charges. This often requires that countries in question have already reached a middle-income status or close to it. If affordability is still a major issue, BOT/ PPP projects may have difficulties in those countries.

5.4 Theoretical Contributions of the Research

While the above is related to the empirical aspect of the PPP issue, the dissertation has also taken up the theoretical aspect. The latter is expected to contribute to the enhancement of the current knowledge base by presenting a different way of looking at existing theories.

(1) Redefinition of PPP

When introducing the concept of BOT, an emphasis tends to be placed on the efficiency gain to be obtained through the application of a BOT scheme for both construction and operation. This paper has, however, addressed a less conspicuous part of the issues, i.e. the structural vulnerability underlying the BOT concept. To elucidate this aspect of the issue, the research goes back to the inception of the concept. A device to make this innovative formula possible was the application of the project finance concept to infrastructure projects. This concept fits well for energy projects, but not for infrastructure projects. Different from energy projects, infrastructure projects do not have off-takers, a key element for commercially viable operations of the energy or other natural resource projects. Demand is not warranted in infrastructure projects, which is the main source of vulnerability of BOT.

Faced with waning interest of the private sector in BOT based infrastructure projects (largely due to the above structural vulnerability of BOT), developing countries have come up with a variety of risk mitigation measures to provide comfort to private investors. Incorporating these counter-measures in model concession agreements has significantly enhanced the reliability of BOT schemes as an instrument for infrastructure development. Since the extent of support by the government is so extensive, BOT has now become more appropriately called partnership. Thus, the PPP can be redefined as contractual arrangements to overcome the vulnerabilities of BOT by incorporating necessary risk mitigation measures in the concession agreement so as to provide the private sector with an increased degree of comfort.

(2) Modification to the Current Form of Value-for-Money Methodology

Since the inception of the PPP concept, the modality of infrastructure service procurement has undergone significant changes from unitary payments-based PPP to BOT-based PPP. Despite these changes, the *VfM* methodology has not materially changed. The current practice is that, in spite of significant difference in structure between unitary payments-based and BOT-based projects, the same VfM methodology has been in use. This paper has proposed modifications to the current method of VfM methodology so as to make it more applicable to BOT type PPP projects. Proposed modifications have been spelled out, which have included: (i) the adoption of a shadow bid pricing approach in the calculation of the net costs of PPP; (ii) incorporation of

financing costs for both PPP and PSC; (iii) explicit incorporation of revenue stream in the calculation of both PPP and PSC; and (iv) incorporation of premium or return on investment for PPP. These are intended to enhance the validity of the VfM methodology in the aegis of rapidly changing modality of infrastructure development toward investment-oriented or BOT based.

5.5 Limitation of the Research and Further Study

PPP may have brought about significant savings to the Government, but it may have incurred substantial costs to the private sector. In order to find whether the introduction of the PPP has brought about net benefits to the society, we need to carry out a comprehensive cost-benefit analysis instead of the VfM assessment as has been conducted in this paper. The cost benefit analysis would allow to assess the overall impact of the introduction of the PPP to be incurred to a broader range of stakeholders.

The cost benefit analysis was, however, not conducted in this Research since the NHDP III has not yet reached the full operation stage in which major benefits would be generated. Once a substantial part of NHDP III has been made operational together with the collection of a broader range of data including those associated with improvement of service quality and indirect costs to the private sector, the author intends to carry out another study on the NHDP III.

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Appendix 1: Key Concepts and Terminologies

Key concept	Description
Build, Operate and Transfer (BOT)	The Government grants to the concessionaire a long-term right to construct and operate specific infrastructure facilities. The concessionaire is allowed to charge users of the facilities to recover the costs of investment and operation. The facilities have to be transferred back to the government at the end of concession period. The private sector (PS) assumes commercial risks since user charges are the major source of revenue.
Public Private Partnership (PPP)	PPP is a long-term contractual arrangement for the development and subsequent operations of a specific facility under terms and conditions agreed in advance between the public and private sectors. While there are several versions of this arrangement, this dissertation would focus on the BOT based PPP, which is referred to in this dissertation as PPP (BOT). Its structure is essentially based on the BOT, but underpinned by the government supports to boost the financial viability of the project so as to minimize the risk of possible failure of the projects.
Unitary payment /Availability payment/ Annuity schemes	The unitary payment scheme is a contractual arrangement in which the government delegates the operation of government assets to the private sector under specific conditions for the predetermined period of time. The government pays a specific amount of payments to the private sector with regular intervals. If the agreement includes a specific clause for the reduction of the unitary payments for the period in which the private sector fails to provide the prescribed level of service, that specific arrangement is called an availability payment scheme. In India, the availability payment scheme is called an Annuity scheme. In the case of "availability payments" or "annuity scheme", the private sector usually constructs facilities under their own financing arrangement. Availability payments or annuity payments would be made only after the completion of construction and the start of

	service provision. The private sector cannot retain the revenue generated by the facilities, which is typically passed on to the government. The facilities have to transfer back to the government at the end of concession. The PS assumes no commercial risk, but is obliged to maintain the required level of service. Any failure results in a reduction in the amount of availability payments.
Public service concession (see NB)	The Government confers to the private sector the long-term right to operate government assets. Costs of the operation of the assets are paid by the government in the form of fixed unitary payments. The assets have to be returned to the government at the end of concession. The private sector assumes no commercial risk.
Political Process Analysis	Political process analysis is a method of analysis focusing on the interactions between various stakeholders/organizations. It would also look into dynamic processes resulting from the above interactions. Main focus of the analysis would be placed on the institutional and behavioral aspects of the issues.
National Highway Development Program (NHDP)	NHDP is a series of programs for upgrading the existing national highway network in 7 stages. First two stages of NHDP, i.e. NHDP I and II, was to upgrade the two lane highways of two trunk corridors of India to four lane standard. The total length of NHDP I and II is 13,000 km. Both NHDP I and II were implemented under the traditional public sector procurement. The rest of the NHDP programs, from NHDP III to NHDP VII, were announced to be developed under the PPP. The latter part of the five stage programs entails the development of 33,000 km of NH systems including the upgradation of a single lane NHs.
Value for Money (*VfM*) Assessment	The "value for money" methodology is a policy tool to be used for determining which type of procurement method should be used between the traditional public procurement or the PPP based route. A central element of VfM methodology is to compare the whole-life cost of a PPP project against that of the publicly executed project, the latter of which is called "public sector

	comparator" (PSC). A unique element of the PSC calculation is its inclusion of all potential risks likely to be encountered if the project is executed under the traditional public sector procurement.
Monte Carlo Simulation	Since the VfM method produces a single point estimate, it is desirable to find the possible range of deviation from this estimate in accordance with a variety of possible risk scenarios. Typically this is done by a sensitivity analysis. However, the traditional sensitivity analysis is not effective in simulating the real world situation since it would estimate the degree of deviation on a single risk scenario. Monte Carlo Simulation allows estimation of the extent of deviation of the outcome based on a multiple-risks scenario. In a real world situation, various risks may occur simultaneously with a varying degree of impact. Since Monte Carlo Simulation produces all conceivable combinations of risks and impacts by randomly assigning values for individual scenarios, it results in a simulation to the real world. This random creation of values follows the probabilistic distribution pattern, which is determined by the assignment of mean value and standard deviation in case of the normal distribution. In this dissertation, Monte Carlo simulation model is used for testing the robustness of a single point VfM estimate.

Appendix 2: Definition of the Public Private Partnership (PPP)

There are a number of definitions of PPP, most of which are defined in a very broad and often open-ended manner. For instance, the definition of the World Bank is as follows:

> "There is no standard, internationally accepted definition of PPP. The term is used to describe a wide range of types of agreement between public and private entities, and different countries have adopted different definitions as their PPP program evolved. Typically a PPP is a long term contract between a private party and a government entity, for providing a public asset or service." (World Bank Institute, PPIAF, "Public Private Partnerships Reference Guide")

The Governmental Accounting Standards Board (GASB) of US has provided a slightly different definition as indicated below:

> "There is no single, widely-accepted definition of the term PPP. However, many descriptions characterize a PPP as an arrangement between a government and a private sector entity to deliver a governmental asset (normally infrastructure or a public facility) and, often, the related public service (in some cases, the arrangement may be solely for the delivery of the public service related to an existing government asset)." (.GASB website, Project Pages, Service Concession Agreements)

Interestingly, both definitions start with a preface stating that there is no universally acceptable single definition, and the definition can be different from country to country or from sector to sector. Taking advantage of this leniency, PPP can be broadly defined as a long-term contractual arrangement between the public and private sectors for the delivery of services with use of government assets. It typically includes: (i) public service concession (unitary payment scheme); (ii) availability payment scheme (annuity concession); (iii) Build Operate Transfer type PPP arrangement (PPP (BOT)); and (iv) Build Operate Transfer (BOT) scheme.

Appendix 3: PPP Systems of Several Countries

This Appendix intends to describe salient features of PPP systems of several countries. Three countries have been selected for this purpose, i.e. Chile, Korea and India. These three were selected on the basis of the relative size of the PPP investment per GDP as illustrated in Table. Another and more relevant reason for selecting these countries is their track records of excellent performance, together with well-structured policy frameworks.

Table 5: Investment per GDP for Selected Countries (US$1000)

Country	Investment in Road Sector (US$ Billion)	Investment per GDP (US$ * 1000)	GDP (US$ Billion)
Brazil	50	21	2346
Chile	10	38	258
China	26	3	10356
India	74	36	2051
Mexico	25	19	1291
Philippines	2	6	284
Thailand	2	6	405
Korea	500	355	1410

Source: World Bank PPI Database (2014)

Source for Korean information: KDI Success story of PPP in Korea (2014)

1 Chile

1.1 Overview

Chile is the first developing country that has successfully implemented PPP programs (While Mexico had started earlier (in 1989), the result was a failure, as noted earlier). Faced with huge investment needs for the development of highway networks, coupled with limited availability of national budget, the Government of Chile decided to introduce the private sector fund. For this purpose, Special Decree of No. 164 (called "Concession Law") was promulgated in 1991, which was supplemented by Special Decree of No. 900 in 1996 and later by Special Decree of No. 956 in 1997 (Lorenzen and Barrientos. 2001). These Decrees fell under the purview of Ministry of Public Works (MoPW) responsible for railways, roads, housing and other infrastructure sectors. Having established the legal framework, MoPW launched a major highway program on a PPP basis. It is a 2,000 km intercity concession program, which started in 1994 with

granting of 12 contracts by 1998. The estimated amount of investment was US$3.3 billion. This program is well known for its success (PPIAF 2008) and had been discussed in detail by Lorenzen and Barrientos (2001). Since 1990s constituted the peak period of highway construction in Chile, this PPP program was selected as a target program for this research.

A central factor that has made this program a success is the strong institutional capacity of MoPW, an implementing agency for road program. MoPW developed and implemented a plan for developing these intercity toll roads without asking the Ministry of Finance to cover part of the program costs. MoPW was able to deliver it through cross subsidization among profitable and non-profitable sections of networks. This has given MoPW a greater degree of administrative freedom from the Ministry of Finance. MoPW's approach was pragmatic and based on gradualism. Each time they launched a new batch of programs, lessons learned from earlier programs were incorporated in the implementation arrangements of the new batch.

Another feature of Chilean PPP is the active participation of foreign contractors. Attracted by the well-crafted policy framework, together with procedural transparency with regard to bidding and evaluation, a number of foreign contractors from Spain and Mexico actively participated in the biddings. Among 12 winning bidders who had participated in the above 2,000km intercity road program, 11 were either foreign contractors or joint ventures in which foreign contractors were lead partners.

Active use of the bond market is another feature of Chilean PPP. In Chile, banks were not allowed to lend more than 15% of the total cost of green field projects. Instead of relaxing banking regulation, the Chilean Government has chosen to allow project developers to raise funds from capital markets through issuance of *infrastructure bonds* (World Bank, 2008). Since then, infrastructure bonds have become a common method for raising funds for infrastructure projects in Chile. In the case of the abovementioned 2,000 km intercity road program, 7 out of 12 projects secured funds through issuance of bonds wrapped by "mono-line services".

1.2 Ways to deal with Vulnerabilities

To deal with demand uncertainty, Chile has adopted MRG. It covers the difference between 70% of the projected revenue and the actual revenue. It was designed to

provide comfort to lenders. For dealing with price escalation, Chile has introduced full indexation. In order to facilitate finance for PPP projects, the Chilean Government introduced in 1999 an exchange rate insurance system for foreign debts upon payment of a 1% premium. This insurance system is activated when the foreign exchange rate against dollar fluctuates by more than 10% over the rate at the time of contract.

2 Korea

2.1 Overview

While Korea started its PPP scheme later than Chile, its scale of investment is huge, surpassing all other developing countries by a large margin.The legal framework of the PPP system in Korea has been developed over years through the enactment of a series of legislations, starting from the "1994 Act for Private Capital Inducement Promotion" through the "1998 Act for Private Participation in Infrastructure" to the "2005 Act for Public Private Partnership in Infrastructure (PPP Act)". According to Korean Development Institute (2014), the PPP investment peaked in 2007 both in terms of the amount of investments and the number of projects, the Research has decided to choose the PPP program implemented under the 2005 PPP Act.

With support of these kinds of legislation, PPP has now become a mainstream method of infrastructure development in Korea, covering 17% of the total investment for nation's infrastructure development (as of 2007). This process of transition from the conventional public sector procurement to the PPP based construction has been facilitated by the Private Infrastructure Investment Management Center (PIMAC) in 1998, which has played a central role in operationalization of PPP programs in Korea. Its main function includes; (i) assessment/appraisal of the government funded PPP projects; (ii) assistance to government agencies in negotiation with PPP developers; and (iii) conducting researches associated with PPP.

Another feature of Korean PPP is the active participation of business conglomerates (Chaebols). The inclusion of these huge corporate groups participating in infrastructure development, the government was able to place large-sized contractual packages for bid. The average size of contract packages in Korea is $450 million, which is much larger than the cases of other countries (for instance, $262 million in Chile and $156 million in India). The ramification of this circumstance is the tendency of longer and complicated

negotiations of contracts due to the equally strong negotiation power of both parties, the Chaebols and the government.

2.2 Ways to deal with Vulnerabilities

To deal with demand uncertainty, Korea employed MRG from 1998 to 2009, but then due to moral hazard problems with the project proponents, the Korean Government decided to replace MRG with Investment Risk Sharing System (IRSS). Since then, IRSS has become the main instrument in dealing with demand uncertainty in Korea.

For dealing with price escalation, Korea has instituted full indexation. As for the PPP measures to facilitate finance for PPP projects, Korean government has provided loan guarantees through the Infrastructure Credit Guarantee Fund run by the Korean Government. If a premium is paid, lenders or project companies are able to avail themselves of this guarantee system.

3 India

As reviewed in the main text, the decision to introduce PPP system in India was made by Prime Minister's Committee of Infrastructure (CoI). A unique element with this decision is that it is based on the decision by an executive body of the government, but not by an act or low, in other words, by an action by the legislative body of the government. In India, the executive branch of the government is strong. Actually many of the important policy initiatives are taken by a body of bureaucrats, called Indian Administrative Service (IAS). This policy development mechanism has enabled IAS officers to devise highly sophisticated policy measures without worrying about potential repercussion from politicians or parliament. This explains why India has taken such highly sophisticated PPP measures as reviewed earlier.

Another unique feature of India's PPP system is heavy dependency on the banking sector for infrastructure financing. As seen in Table below, more than half of the total debts financing (51%) in India have been provided by commercial banks.

Table 6: Infastrucutre Funding in India for Two Years of 2010/11 and 2011/12

Providers of funds	Rupees (billion)	% over debt financing	% over the total funding
Commercial banks	2,020	51%	35%
Non bank financial institutions	1,007	25%	17%
Insurance companies	423	11%	7%
External commercial borrowing	505	13%	9%
Sub-total: Deb financing	3,955	100%	68%
Equity financing	1,846		32%
Total	5,801		100%

Source: Planning Commission, March 2010

While the banking sector has been a major provider of funds for infrastructure, commercial banks are not enthusiastic lenders to infrastructure because of an asset liability mismatch problem associated with lending toward this sector. Infrastructure projects entail the long gestation period and thus require the long term funds, while the sources of funds of commercial banks are essentially short-term in nature. This makes banks reluctant in committing much funds for infrastructure projects.

To address this problem, the Government of India has come up with a unique arrangement, which is "take-out financing". As seen earlier in Chapter 4, the arrangement is designed to alleviate the above concerns by enabling banks to offload excessive exposure to infrastructure projects from their balance sheets (Khan, 2012). As an instrument to facilitate this process, the Government has established a state own financial institution specializing in the provision of refinance to borrowers in the infrastructure sector, called Indian Infrastructure Finance Corporation Company Limited.

An issue is whether the heavy dependency on banking sector, backed by this take-out financing arrangement, would continue to play a central role in infrastructure financing. A possible problem with this prospect is the dominance of the public sector banks (PSBs) in the banking sector which has been smeared by increase in non-performing loans and poorer performance compared with the private sector counterparts. The Economist (2016) stated that, while 17% of PSB loans have been soured, while less than 5% has been soured for private sector banks.

PSBs have been long dominant in the banking sector. In India, banks had been

nationalized in several waves since 1969. One of the reasons for this series of nationalization was to prevent commercial banks to be overly influenced by a small number of business families and made its loans widely available to all groups of the society including lowest caste and scheduled tribes. While private sector banks have now been allowed to re-enter into the markets and actively pursuing banking operations in India, the PSB segment still accounts for 70% of bank loans (the Economist 2016). It should be noted that most of the infrastructure loans have been provided by PSBs, while the private sector counterparts have focused on consumer loans which offer more lucrative commercial opportunities. In other words, infrastructure sector has been benefiting from this uniquely structured banking sector in which PSBs have been providing major parts of infrastructure funds.

An issue is how vulnerable the current PSB segment of commercial banks is. While it has not reached to a crisis level, it is true that the asset quality of PSBs has been deteriorating as indicated in the IMF report[32]. Because of higher percentage of risk assets, the PSB segment of the banking sector requires capital injections which would provide necessary cushions to PSBs in case of major financial turmoil. Meanwhile the same report of IMF stated that re-capitalization is manageable under the current financial position of the PSB segment.

A more permanent solution would be provided by the development of more active capital markets. Long term funding needs should be fulfilled by long term funds to be mobilized through those institutions such as insurance companies and pension funds. While bond markets have not yet been fully developed in India, it has been playing an increasingly important role as sources of infrastructure funds. As seen in the above table, insurance companies have now been covering 11% of the infrastructure debt funds. A remaining challenge for India is the development of more vibrant and diversified capital markets which could attract a broader range of financial institutions to infrastructure markets.

[32] Corporate and Banking Sector Vulnerabilities in India: Selected Issues.
IMF Country Report No.16/76 (March 2016): 5-13

Appendix 4: Mexican Experience in BOT Undertaking for Highway Development

Mexican experience in BOT initiatives well illustrate the need to consider the fiscal consequences when trying to secure private sector participation for infrastructure development.

Immediately after the inauguration of a new cabinet, the Carlos Salinas Administration announced a major highway program to develop 5,000 km of toll roads under the BOT scheme. After a series of consultations with the private sector, his Administration decided to adopt the shortest concession period as a primary selection criterion for bidding as requested by the construction industry.

This selection criterion worked well at the initial stage as demonstrated by the active participation of the private sector in the BOT programs and also by the early completion of the construction. But the program soon encountered a major problem at the user side. As soon as the construction was completed, the concessionaires started setting the price quite high -- almost at its maximum allowable level. Since the maximum level of prices were leniently set by the government, it invited strong opposition from the users. Many users refused to use the newly developed toll roads, instead continuing to use congested but cheap regular roads.

Facing with a serious revenue shortfall, many contractors began defaulting. This necessitated the government to extend a huge bailout to the contractors and lenders. 23 of 53 contractors were rescued by the government, who took over their loans and repaid financiers. The amount the government paid out to banks reached $5 billion. Additional payments of $2 billion were made to contractors for compensating their loss incurred by the government request to lower user charges to the affordable level. The total of $7 billion bailout had been paid to the private sector. In view of the originally estimated size of the program being $13 billion, this size of bailout clearly indicates that the program had failed to achieve the originally intended objective of the program. (Matinez, 2011).

Appendix 5: Distribution of Individual Projects Consisting of NHDP III

The distribution of individual projects of NHDP III is most likely to follow the normal distribution in terms of the length of road as indicated below. This means that there would be not much difference between the mean and the median. This indicates that the method of taking average of individual projects in order to get the data for the representative project for NHDP III is appropriate.

The reason why the author stated "most likely" is that the data for the representative projects was calculated on the basis of NHDP III data base available as of September 2013, consisting of 100 projects under implementation at that time. The figure below was constructed based on the 102 projects under implementation as of the 30th of June 2016. While the base years between two data-sets are different each other, since both of these data are sourced from the same data base compiled by NHAI, these data can be understood representing relatively well the distribution of 100 projects under implementation at the time of September 2013.

Figure 13: Frequency Distribution of Project Lengths of NHDP III