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Road Learnings: Evolution of Public-private Partnerships in the Indian Highway Sector

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Abstract

Three decades of public-private partnerships (PPPs) have witnessed significant evolution in policies and practices. However, the critical success factors for PPPs influence their early and late stages differently. Natural experiments provide one of the best settings to identify these differences. This paper exploits one such instance in the context of road project upgradations in India.

The fundamentals established by the first road PPP project in India were completely revamped during the re-conceptualization of the project twenty-five years later. Comparing and contrasting the two projects provided evidence of the differences in the influence of critical success factors at the two stages. At the institutional level, the findings reflect an evolution in motivations, maturity in regulatory frameworks, and changes in performance perceptions. Significant differences between the PPP models deployed in the two stages were also found. The government's willingness to take greater financial and economic risks were found to drive these changes. Upon comparison with the existing literature, this conclusion is indicative of different drivers of change in business models across emerging economies.

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1.0 Introduction

With 4.24 million km of road, India has the second largest road network in the world (NHAI, 2015). Targeting the upgradation of the road infrastructure, the country has one of the largest public-private partnership (PPP) program that has been going on for three decades now. These PPPs are long-term infrastructure concessions, and they have significantly evolved from their first adoption, which was modelled on the United Kingdom's Project Finance Initiative (Parker & Figueira, 2010). Significant learnings have taken place during this period. (Hodge, Greve, & Boardman, 2010). The primary learnings relate to the formalization of a concession policy framework, maturity in contract agreement clauses, increasing user's readiness to pay for public services, and enabling an ecosystem of project stakeholders (i.e., private contractors, financiers, transaction advisers, and consultants) (Trebilcock & Rosenstock, 2015; Verhoest, Petersen, Scherrer, & Soeipto, 2015). These learnings, on the one hand, reflect the emerging need to rethink the PPP concept (Greve & Hodge, 2013; Garg & Garg, in press), and on the other, it underscores the need for unscrambling the early lessons from the later ones. Both, the large investments involved

and the long-life cycles of PPPs, make this unscrambling salient. Learnings tend to become ambiguous, as early and later experiences contaminate one another (Wang, 2015). The early lessons may no longer be relevant in evolved contexts, as they get addressed over time. Similarly, the later lessons may not be relevant to contexts that are new to PPPs. Natural experiments provide a unique opportunity to untangle the intermingled new and old learnings in an ever-evolving policy framework (Gerring, 2004). However, on account of the relatively recent emergence of PPPs and their long-term nature, most projects are in their early life cycle stages with few such contexts available for study. The study exploits the author's access to one such context. To disentangle the early and later learnings a comparative case study approach is adopted (Kaarbo & Beasley, 1999) and two road upgradation projects, on the same stretch of road, compared. These projects were implemented 25 years apart in India.

The first project marked the beginning of the Indian highway upgradation era.ⁱ Initiated as a financial leasing arrangement, it over time developed into a PPP. It was taken up at a time when India's economic condition was weak, and the resource-constrained government was exploring policy innovations to leverage private resources for addressing the large infrastructure gaps, with little prior experience with such concessions. The second project was taken up at a time when the government had gathered significant experience with concessions in the transport sector. The Indian regulatory and institutional market for infrastructure concessions was ranked first in the Asia-Pacific region in "Operational Maturity" for PPPs, third for sub-national PPP activity and fifth overall regards to having an ideal environment for PPPs (Economist Intelligence Unit & Asian Development Bank, 2015). However, the private sector was shying away from investments in public infrastructure. This is evident from the number of concessions signed touching their nadir in 2016. The government wanted to identify and address the numerous issues that had emerged. It was once again exploring options to uplift the sinking private market sentiment. The second project captures the essence of the policy and practice changes adopted by the government.

The existing literature motivates the study on PPP learnings that identifies the critical success factors of PPPs to lie in the external environment, internal project characteristics, and partnership related factors (Bayliss, & Van Waeyenberge, 2017; Greve & Hodge, 2013; Trebilcock, & Rosenstock, 2015; Wang, 2015). Evaluation of the patterns of similarity and differences between the two highway projects presents fresh insights on how these manifest in the two projects. This enables disentangling of early and later year learnings, and identify the challenges that the PPP phenomenon is expected to face in the future. After a brief review of the literature on PPP learnings, the adopted methodology for the study is described. A historical perspective on the project is presented next to provide the background for the descriptive narratives of the two cases. Analysis of the case comparison is done adopting a parsimonious theoretical framework, and learnings from the analysis distilled out as road learnings.ⁱⁱ Highlighting the key developments in the Indian Highway PPP program over the course of the two projects, the paper also describes the evolution of one of the world's largest highway upgradation program.

2.0 PPP Learnings.

PPP infrastructure development frameworks have evolved continuously over time (Parker & Figueira, 2010; Greve & Hodge, 2013). This evolution is driven by the external environment, internal project characteristics, and partnership related factors (Wang, 2015). The external environment refers to the demand of infrastructure, support from the government regarding political ideology to create legitimacy, the legal and regulatory environment, and the dedicated government PPP units to enable implementation (Mahalingam, Devkar, & Kalidindi, 2011; Verhoest et al., 2015; Wang, 2015). The internal project characteristics include resource availability, financial viability, project design, a maturity of contractual documentation, project management functions, and project type and complexity (Koppenjan, 2005). The partnership related factors include the government's PPP related capacity, the robustness of the selection process, and the role division and risk allocations (Liu, Wang & Wilkinson 2016;

ⁱ The project is recognized as the first highway PPP project of India (Ramakrishna & Raghuram, 2012).

ⁱⁱ ROAD LEARNING is a technical term used in the transportation industry. It signifies the learnings that one, typically a trainee driver, makes while traversing a road for the first time, before one is ready to take a train or vehicle independently on it.

Grimsey & Lewis, 2002; Klijn, Edelenbos, Kort, & Twist 2008).

Government support is essential for the implementation of PPPs in European nations (Verhoest, et. al. 2015). Comparing and contrasting the PPPs in developed and emerging economies, Parker & Figueira (2010) identify PPP success to be driven by learnings in pre-planning inputs, institutional and financial support, revenue stream identification, project preparation, fiscal risk management, civil society involvement, procurement competitiveness, etc. More recently, Trebilcock & Rosenstock (2015) argue that the institutional capacity is the key determinant of PPP success in emerging economies. Mahalingam et al. (2011) while studying Indian PPPs underscore the important role played by government coordination in enabling PPPs. The dominant theme in the literature attributes PPP success to the role played by the government. The government provides the –necessary institutional and regulatory frameworks, a maturity in which provides the atmosphere necessary to attract private investment into public infrastructure upgradation. Further, transparent and procedure oriented implementation of government processes allows the private sector to exploit its efficiency and earn returns from the successful delivery of public infrastructure.

The continuous evolution of PPP frameworks, a myriad of factors impacting PPP success, and the differences in the developed and emerging economy contexts make one wonder how the critical factor for success has evolved in the emerging economy context. This gap helps to sketch out the research question – How have PPPs developed in emerging economies? The context of emerging economies is important as they are significant regarding their numbers, and also the investments that they command. However, evolutionary studies of PPPs in emerging economies identifying the important factors and the process of PPP development are few. The reason for this is attributed to limited access to public projects and the unavailability of credible data sources (Mu, de Jong, M & Heuvelhof, 2010).

3.0 Methodology

The continuously evolving nature of PPPs in emerging economies is the key challenge in identifying how they have developed over time. A case comparative approach to study a natural experiment is employed to negotiate this challenge. Two road upgradation projects, taken up on the same stretch of road twenty-five apart, provide the context of the natural experiment (Dunning, 2012). The two projects captured the salient aspects of PPPs at two different stages of their evolution, enabling a study of developments over time in an emerging economy context. While the first project marked the beginning of India's PPP journey, the second project captures the essence of recent developmental trends of the Indian Highway PPP program. Henceforth, the projects are referred to as the *first* and *second* project, respectively.

The study adopts Yin's (2013) definition of a case study -- "*an empirical inquiry that: investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident; and ... [that] relies on multiple sources of evidence*". Following this, comparative case studies are a systematic comparison of two or more data points ("cases") obtained through the use of the case study method (Kaarbo & Beasley, 1999). The comparison taken up here is "*focused because it deals selectively with only certain aspects of the historical case... and structured because it employs generic questions to guide the data collection and analysis in that historical case*" (George, 1979, pp. 61-62).

For the comparative case study analysis, the six-step procedure proposed by Kaarbo & Beasley (1999) is adopted. As per this procedure, a specific research question needs to be specified as the first step to carry out a focused comparison. As motivated earlier, the research question guiding the comparative case study is, "How have PPPs developed in emerging economies?" The second step requires the identification of variables for study from existing theory. For this, Wang's (2015) recommendations are adopted, and comparative case analysis is carried out based on the three broad categorizations of critical success factors for PPP – external environment, internal project characteristics and partnership related factors. Wang (2015) had used this framework to carry out a comparative case study of six American toll road projects that were taken up in two different eras. The similarities among this and Wang's (2015) study, which is also a comparison of toll road projects across two eras, motivates the use of the template for the analysis here. Each of the critical success factor categories consists of numerous sub-factors. These were used to identify the variables to study during the comparison. As part of the third step, i.e., case selection-

two highway upgradation projects on the same road stretch were selected. This is a natural experiment (Dunning, 2012). As descriptive narratives are the most used and preferred form for case description (Yin, 2013), these are provided. The two projects were taken up twenty-five years apart, during which time some significant changes took place in the Indian highway sector. Hence, the case descriptions are supplemented with observations for this period. Fourth and fifth step involves identification and analysis of the variables of interest in the context of the cases. As a part of these steps, a detailed feature comparison of the two projects is tabulated. The narratives and case comparisons are next discussed and the learnings extracted.

Multiple sources of data are relied upon to collect project information. Project documents like detailed project reports, concession agreements, minutes of meetings, press coverage, and press releases were collected and studied. The documents studied included a significant amount of information embedded in government files, which were sought through Right to Information requests to the government. Numerous interviews with senior project managers and government personnel associated with the projects (5 for the first project and 3 for the second project) were also conducted. The case facts were triangulated, and where required clarifications sought from the project managers, to whom the authors had continuous access.

4.0 Case Context: Rau-Pithampur Road

Rau-Pithampur Road, an 11 km link road connecting the suburbs of Indore City to Pithampur, constitutes the context for the case.ⁱⁱⁱ While Indore is the largest metropolis in the state of Madhya Pradesh, Pithampur hosts the largest government sponsored industrial area in central India. The first toll plaza on this road was commissioned with a lot of celebrations on November 1, 1993, and a new era of infrastructure development ensued. Private finances had been used for the construction of public infrastructure for the first time. This also symbolized the baby steps of the Indian economy which had just opened-up and was starting to explore liberalization and globalization (Ahluwalia, 2002). However, the celebrations were short lived as the project faced one controversy after another.

The *first* project was commissioned with numerous delays, scope changes, and contractual modifications. A decade later in the year 2001, the government forcibly took over the project and stopped the flow of toll collections to the private concessionaire. A long-drawn arbitration ensued. This award has since been legally challenged and is being contested in courts. A project originally conceived at an estimated cost of ₹1.8 million (Indian Rupees 1.8 million) is being contested for compensation claims of over ₹250 million.

In the year 2014, the upgradation of the same road stretch was taken up as the *second* project—upgradation from a two-lane road to a four-lane divided highway. This time the project aimed to negotiate the numerous challenges that had emerged in the use of PPPs in Indian highways (Economist, 2012; Pratap, 2013b). The project incorporated a new approach to PPPs (discussed in detail later), and it was commissioned on March 27, 2016, being completed on time and under budget. It was the first project to incorporate the new approach. This time project commissioning was a quiet affair -- no ribbon cutting, no visits of dignitaries, and no press releases, quite in contrast to the *first* project.

Both the road projects, the one in 1991 and the one in 2014, were national public policy experiments. They were innovations attempted in challenging dynamic economic environments, to address the ills plaguing growth of an emerging economy. Both were PPP projects on the same road but had very different concerns and issues. These are identified and discussed below.

5.0 First Project

The political head of the state of Madhya Pradesh witnessed the wide-spread industrial progress of Japan during

ⁱⁱⁱ A small town in the Dhar district near Indore, India.

an official visit in 1985.^{iv} Impressed by the same he was keen to replicate it in India, and on return formally stated a vision to develop the industrial park at Pithampur into the “Detroit of India.”^v The government had already acquired approximately 2000 hectares of agricultural land for setting up the industrial park. In a short period of five years, the industrial park had developed into a manufacturing hub and had become home to some of the biggest industrial houses of India. It was also home to over five hundred medium and small scale industries.^{vi} The industrial park was managed by a government owned and run corporation, i.e., Madhya Pradesh Audhyogik Vikas Nigam (MPAKVN).

The industrial park, however, faced numerous challenges. One of the major ones being connectivity. On the one hand, it had limited residential developments with neither schools nor hospitals, and on the other, it was located 37.5 km from the nearest city centre - Indore. To travel to Indore one had to either take the road (route AKMNDI in Figure 1) that had restricted access as it passed through a defence town or take the circuitous village road through Betma village (route AJFGHI). These roads were not only narrow and unsuitable for the movement of heavy vehicles, like buses and trucks, but they also carried heterogeneous traffic, requiring simultaneous negotiation with pedestrians, tractors, bullock carts, hand pulled carts, bicycles, and two-wheelers. The daily commute between Indore and Pithampur was time-consuming, hectic, uncomfortable, and full of hassles.

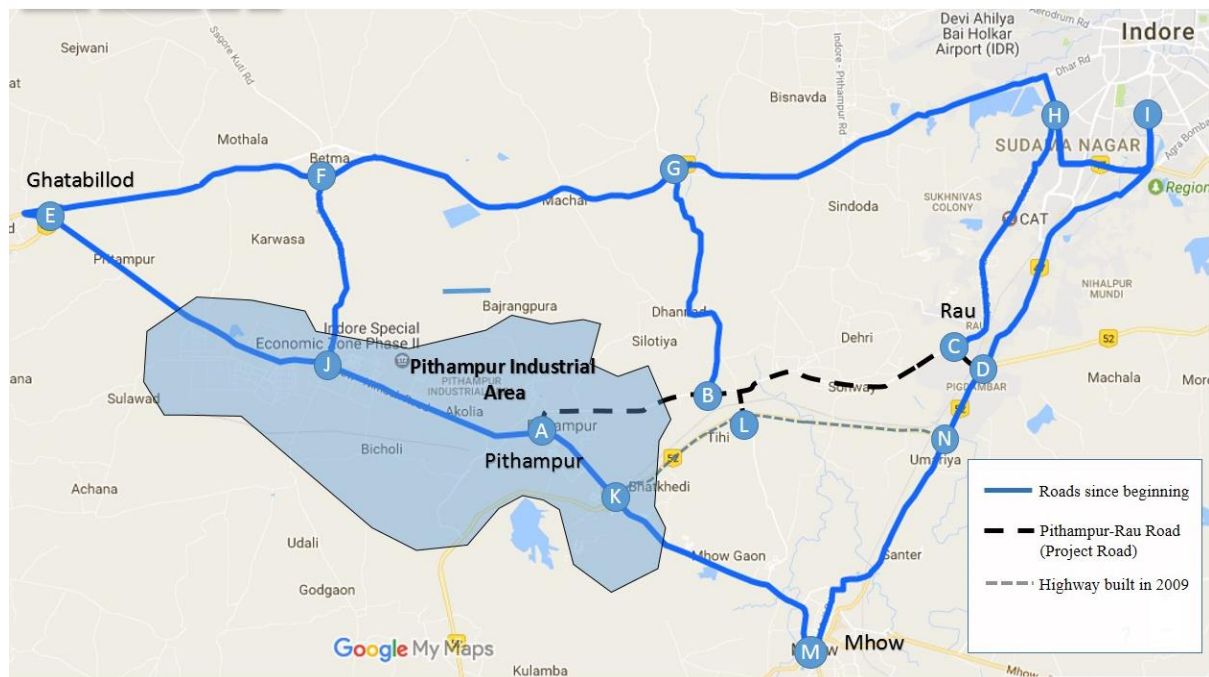


Figure 1 Geographic layout of Pithampur Industrial Park, Indore and the roads connecting them.

Source: The figure has been constructed by the author for illustrative purposes by imposing a layer on the maps provided by google.

Construction of a new 11.5 km link road, at the cost of ₹1.8 million, between Pithampur and Rau (route ABC in Figure 1) could address this problem. It would supplement the two existing roads, and also provide a direct road between Pithampur and Indore, reducing the distance by 10 km (from 37.5 km to 27.5 km, compare route AKMNDI

^{iv} Shri Arjun Singh was the Chief Minister of Madhya Pradesh, the political head of the state, from 1980-1985 & again in 1988-89.

^v Pithampur is often referred to as the “Detroit of India”. Singh, N.K.(April 15, 1988) Out of Gear-Trouble in India’s Detroit, India Today.

^{vi} See <http://dcmsme.gov.in/dips/DIP%20Dhar.pdf> and http://www.ind-expo.com/indl_list/indl_pithampur.htm.

and route ABCDI in Figure 1).^{vii} The initially estimated cost was revised to ₹2.4 million after including the compensation for land acquisition and the cost of a 60 m long bridge over the non-perennial river Gambhir. The project was proposed for inclusion in the 1989 financial budget of the state, but the poor fiscal condition of, both, the country and the state, blocked its sanction. Being on the priority list of the state's political head, the little funds that the government departments could spare were used for land acquisition. However, there was hardly any construction activity.

It soon became apparent that the cost estimates had been made assuming a rural road specification. A road to these specifications, would not be able to handle the heavy industrial traffic of trucks and buses that the road was expected to carry. The industrial park needed an asphalted road, which was estimated to cost ₹15.8 million.^{viii} In early 1989, the link road project had only one hurdle – availability of money. MPAKVN was ready to pilot the project, the government was ready to take up the construction work, the industrialists investing in Pithampur wanted it, and even local contractors had come forward and demonstrated their capabilities to take up the project.

5.1 Enabling Feasibility

The time-period -- years 1987-1990 was the time when the Indian economy was taking its first steps towards liberalization and globalization (Ahluwalia, 2002). The government was examining numerous options to channelize investments into public infrastructure. Unlocking of the idle funds lying with public sector organizations (banks and financial institutions) for investments in public infrastructure was emerging as an attractive option. Enabling this the government created some quasi-government bodies. It invested public funds in them as equity and vested their management into professional hands, keeping them out of the bureaucracies' stronghold (Datta, 2009).^{ix} IL&FS (India Leasing & Financial Services Limited) was one such quasi-government body that was created in 1987. Its equity contributions came from a public-sector bank (Central Bank of India), and two other public institutions (Unit Trust of India and Housing Development Finance Corporation). It was mandated to invest in infrastructure and emulate the Public Finance Initiative of UK (Parker & Figueira, 2010), which was rapidly emerging globally as an attractive mode to finance public infrastructure.^x

Alignment in the mandates of the two different arms of the government-- IL&FS and MPAKVN emerged (Sinha, 1997). While IL&FS was mandated to finance public infrastructure projects (i.e., projects with significant public utility value and long gestation periods), MPAKVN needed finances for the Rau-Pithampur link road project. The board members of IL&FS inspected the project in March 1989 and agreed to finance the project.^{xi} It was mutually agreed that IL&FS would pay for the construction of the road, the government would do the construction, and MPAKVN would collect the toll. The toll collections would be deposited with IL&FS for ten years to reimburse for its road construction investments. As per the project's financial model, the expected toll revenues would enable the project cost (escalated to ₹20 million by then) to be recovered in eight years, with two years of trailing period.^{xii} Refer Table 1 for the breakup of the estimated project costs at the different times.

Table 1 Project cost estimates at different times

(Figures in ₹ Millions)			
<i>Item of Work</i>	<i>First Project-1990 Initial Estimate of</i>	<i>First Project -1993 At Completion</i>	<i>Second Project- 2014 Initial Estimate</i>
Asphalting	8.77	27.77	424.22

^{vii} As per Mr. Gautam Kothari, President of the local body of industrialists, it was he who had come up with this proposal.

^{viii} Draft Minutes of the 2nd meeting of the Co-ordination and Advisory committee for Industrial Growth Centre Pithampur held on October 20, 1988.

^{ix} Other such organizations created at around the same time were IDBI, ICICI, and IDFC.

^x Source <http://www.ilfsindia.com/pdf/ilfsnew.pdf>.

^{xi} Minutes of the 4th meeting of the Co-ordination and advisory committee for Industrial Growth Centre Pithampur held on 13th March, 1989.

^{xii} This aspect was recorded in the concession agreement signed in 1990.

Earthwork/WBM	Government inhouse	12.18	149.24
Bridge	3.10	9.18	52.86
Approach Roads	5.90	4.35	32.29
Consultancy		1.25	0
Miscellaneous	2.23	5.76	139.95
Interest		8.25	0
Management Fee		0.70	0
Grand Total	20.00	69.44	788.56

IL&FS's management saw this arrangement risky as their role was restricted to providing finances, with no control over how the money would be spent. The government's construction department which was supposed to spend their money in construction was infamous for inefficiencies and poor project delivery. They sought multiple assurances from the government, which the government ceded to. A *long-term lease agreement* of the land for the road was signed in favour of IL&FS and offered as *collateral* for the project. To protect the project returns, IL&FS also negotiated an *assured return* of 15% on its financial investment.^{xiii} It was further agreed that in case IL&FS was unable to recover its investments in 10 years, the lease period would be extended to 15 years with mutual consent. A *tripartite agreement* to this effect was signed between the state, IL&FS, and MPAKVN on June 15, 1990.^{xiv} (Table 2 provides the basic details of this agreement).

5.2 Construction

The government delayed the project construction start as it did not possess the required technical and managerial resources to take up a project of this magnitude. IL&FS had, by now, created a sub-division specializing in construction and project management, and it offered to take up the construction. Consequently, the construction and supervision activities were handed over to IL&FS, and they were promised an additional 1% assured return on investment, over and above the already promised 15%.

When construction started, numerous faults with the project estimates were reported, and scope creep ensued. The project's cost increased due to upgradation of technical specifications, and provision of additional features like road lighting, enhanced toll plaza amenities, and additional environmental and safety audits. MPAKVN reluctantly approved the increase in project cost to ₹40 million and subsequently withheld approvals. With both financing and construction being done by IL&FS, the government officers viewed approvals as a mere formality and refused to participate as they had no influence on construction or control over costs.^{xv} By the time the project was commissioned on November 1, 1993, IL&FS had reported a construction expenditure of ₹69.42 million (Refer to Table 1 for the cost breakups). As per the terms of the agreement MPAKVN started toll collection^{xvi} and deposited the same in a separate bank account from where they were transferred to IL&FS.

5.3 Operations

^{xiii} As per the Agreement of Rau Pithampur Road Project signed between MPAVN, MPAKVN (Indore) and IL&FS (1990).

^{xiv} Soon after this project, IL&FS signed *memorandum of understandings and agreements* with a number of state governments in India, all aimed at developing public infrastructure. Many of these early signed PPPs agreements continue to operate even today, including the Delhi-Noida Toll Bridge (connecting New Delhi with the large industrial hub in the adjacent state of Uttar Pradesh), Vadodara Halol Highway (connecting the city of Vadodara with the industrial town of Halol), and Ahmedabad Mehsana Highway (which connects the state capital of Gujarat with the industrial town of Mehsana).

^{xv} This cost breakup was provided by M/s IL&FS in response to writ petition filed by Shri Gautam Kothari, President of Pithampur Audhyogic Sangathan on MPAKVN, MPAVN and IL&FS (1993).

^{xvi} In response to the Miscellaneous Petition no. 2200 (1993), filed by Shri Gautam Kothari, Rates disclosed by IL&FS ₹ 2/- for 2 wheelers, ₹ 3/- for 3 wheelers, ₹ 10/- for 4 wheelers, ₹ 15/- for Light Commercial Vehicle and ₹ 20/- for Bus or Truck.

The commissioning of the road received a mixed response from the public. Paying for use of a public infrastructure was a new idea, which lacked public consensus. Numerous public protests emanated against the toll imposition, and the toll collections had to be frequently suspended. The protests went beyond the issue of toll imposition to claims about the project being a *public loot*. It was argued that the project had been over invoiced by IL&FS;^{xvii} it was alleged to be a cover-up for the ₹2.3 million of government expenditure before IL&FS stepped in;^{xviii} the future payment commitments to IL&FS were viewed as being disproportionately high (some claimed that IL&FS would receive ₹266 million in 10 years to extend a loan of ₹68 million);^{xix} and the quality of the constructed road was reported to be substandard. Public interest litigation was also filed against the government, MPAKVN, and IL&FS. They were accused of working against public interest as they had imposed a heavy toll for the use of a public asset.^{xx} MPAKVN in response argued that none of these protests or complaints came from “genuine industrialists” who were routinely paying the toll. The road saved them both fuel costs and time due to a shorter distance.^{xxi}

Five years after project commissioning, IL&FS transferred the project to MPTRL (i.e., Madhya Pradesh Toll Roads Limited), a Special Purpose Vehicle (SPV) created solely for this purpose. MPTRL had 20% seed equity from MPAKVN, with the rest having been contributed by IL&FS. It raised debt from the market and reimbursed IL&FS for its investments in the project. Simultaneously, the responsibility for toll collection was transferred from MPAKVN to MPTRL (Sinha, 1997). As MPTRL was now bearing all the project risks (operations, maintenance, and toll collection) the rate of return on the investment was upwardly revised from 16% to 20%. With all these changes, the first road infrastructure PPP of India took final shape in 1996.

5.4 Transfer

The servicing of debt raised by MPTRL to pay IL&FS for the project construction led to financial stress on the project, at a time when the toll revenues in the project were far below expectations.^{xxii} Third party assessments also confirmed that the project was not financially viable at the prevailing traffic levels and toll rates.^{xxiii} Consequently, MPTRL made representations to the government for an increase in toll rates and extension in the toll collection period. While these were allowed by the contract agreement, the government did not provide any relief.^{xxivxxv}

To mitigate the losses in the project, IL&FS decided to pursue alternative proposals with the government. In the year 2000, it submitted a proposal to take over a further 20 km of roads (circumscribing the Pithampur industrial area – the route AJDCBFA in Figure 1), and upgrade the same at an additional cost of ₹1.5 billion. As this upgradation would significantly improve access to the industrial park, it was expected to boost industrial activity in the region, transport

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- xvii Dainik Bhaskar (1993, a local daily; Nav Bharat (1993), a local daily; Swadesh (1993), a local daily; Nayi Duniya (1993), a local daily.
 xviii Ibidem.
 xix Nayi Duniya (1997), a local daily.
 xx A car was being charged a toll rate of ₹ 10/- for a one way passage in 1993 on project commissioning. The value of this ₹ 10/- when computed with GDP at constant prices in 2013 comes to about ₹ 90/- for a one car passage. This amounts to almost ₹ 9/- per km, against the NHAI base rate ₹ 1/- per km for a single journey for a car in 2015, after making all adjustments for inflation.
 xxi In response to the Miscellaneous Petition no. 2200 (1993), filed by Shri Gautam Kothari, IL&FS filed their response and stated that Shri Gautam Kothari should be charged ₹ 100 thousand or the cost of defacement of Road Sign. The honourable court dismissed the petition filed by Shri Gautam Kothari.
 xxii Project documents record daily toll collections to be of the order of ₹10,000 per day.
 xxiii Independent traffic assessment carried out by SGS Institute of Science and Technology, Indore for IL&FS as submitted by M/s IL&FS in response to the petition filed by Mr. Gautam Kothari.
 xxiv Clause 25 of the Tripartite Agreement of Rau Pithampur Road Project signed between MPAVN, MPAKVN (Indore) and IL&FS (1990).
 xxv Clause 31 of the tripartite agreement states, “*The entire financing proposal has been structured on the basis of expected traffic and toll collection, based on the rate presently prevailing in the State of Madhya Pradesh. Based on the present indication, it is expected that it would be possible to recover the final total landed cost of the project and minimum return within a period of 8 years from the date of completion of Project. In the event that the collection does not provide the requisite pay-back, it is proposed that the scenario would be reviewed in its entirety at the end of the 10th year to take stock of the situation in terms of revenue collection and expected flows in the ensuing years. It would, thus, be incumbent upon MPAVN to repay IL&FS the balance due to IL&FS over the succeeding 5 years in instalments as mutually agreed upon, so however that at the end of the 15th year from the date of completion the total amount due is repaid.*”

requirements, and raise toll revenues. As part of this proposal, IL&FS also proposed to take-over the entire Pithampur industrial park on the lease, including its 2000 hectare land bank. Professional operation of the industrial park was also argued to eventually contribute towards the developmental objectives of the state. IL&FS also expressed its intentions to take over the other six industrial parks in the state, along with their large land holdings.^{xxvi} However, none of these schemes received the approval of the government. Some viewed it as a victory of the public interest over private profit seeking opportunism, while others saw it as a lost opportunity for improvement of the government's way of working.

Not having extended the agreement beyond the original ten-year period, MPAKVN took over the toll plaza in 2001. It continued toll collections but stopped their onward flow to MPTRL. With no visible sources for recovery of equity, assured returns, and un-serviced debts, IL&FS made a financial claim on MPAKVN that was refused. An arbitration panel was setup in 2003 to resolve the dispute. The arbitration award on September 16, 2008, negated IL&FS's claim for 20% assured return in the project but recognized the 16% assured returns. It awarded a claim of ₹129.3 million to IL&FS, which carried a 6% annual interest from the arbitration start date. MPAKVN refused to settle the claim payments or the interest payments, which had escalated to ₹240 million by this time. In 2012, MPAKVN decided to appeal against the arbitration in the judicial courts.

6.0 Intervening Decades

The Indian highway sector embarked on its PPP journey in 1996 when the first couple of concessions were signed (refer to Figure 2). Governments at, both, central and state levels tried the different PPP models with different combinations of Design, Build, Operate, Finance, Transfer, Maintain, Toll, Grant, and Annuity. The institutional and regulatory adaptations to enable PPPs in highway took place in two distinctive decade long phases, i.e., initial experimentation phase (1996-2006) and maturity phase (2006-2016).

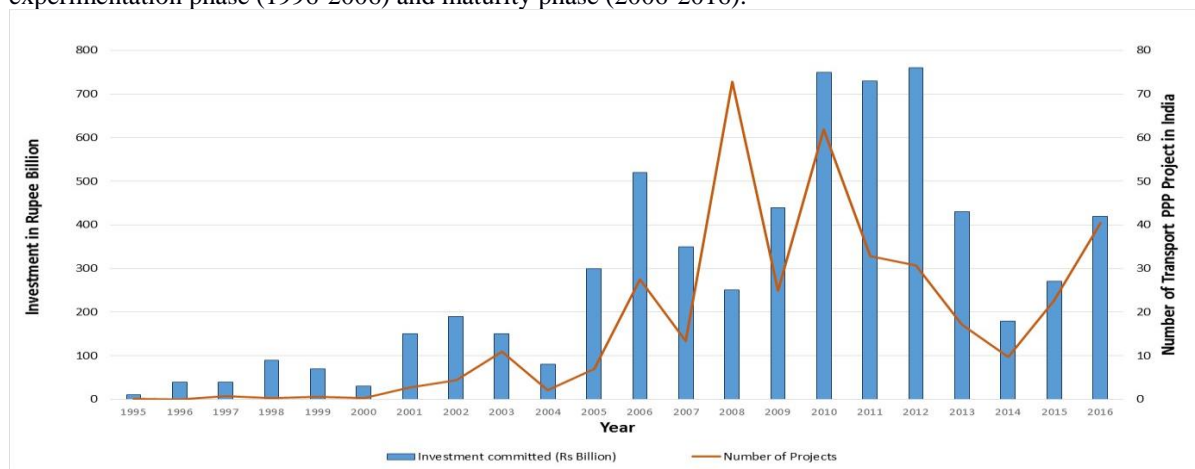


Figure 2 Indian Transport PPPs

Source: This chart is prepared based on data freely accessible from the Government of India website (<https://www.pppinindia.gov.in/ppp-project-data>). This is the source data for the World Bank website (<http://ppiaf.worldbank.org>) and is maintained by the team that approves private participation in Infrastructure at central government level

6.1 Initial experimentation phase (1996-2006)

^{xxvi} These views find a mention in numerous draft agreement copies available in the government files. These were also confirmed during interviews with the government officials who were associated with the project in different capacities during this time period. The facts during the personal interviews were shared under promises of anonymity.

The country embarked on its PPP journey with several small projects for upgradation of small bridges; city bypasses, railroad crossings, etc. These were distributed across the length and breadth of the country, with different government agencies piloting them. Between the years 1996 and 2000, twenty highway projects were awarded as PPPs. Leveraging the learning from these initial experiences a bold national project for four-laning of highways across the breadth and length of the country was launched in the year 1999 (NHAI, 2015). 322 road projects were taken up to upgrade over 13000 kilometres of roads. As the PPP model was not yet considered mature, only 22 of these projects were awarded as toll based concessions, with a further 27 as annuity payment based concessions (Ramakrishna and Raghuram, 2012). Lack of standardization in the concession agreement clauses was recognized as the primary shortcoming of the transport policy during this phase.

6.2 Maturity phase (2006-2016)

After experimenting with different kinds of concession agreements, the central government approved model concession agreements for highways in 2006. These were approved separately for toll, grant, and annuity based projects. Numerous institutional mechanisms were also setup to enable PPPs. These included finalization of standard manuals for road technical specifications; guidelines for government offices to approve PPPs; standardized delivery of PPP training; sectoral model concession agreements; databanks of transactions advisors, consultants, and independent engineers; and standardized evaluation of concessionaire capacities. These steps led to a significant increase in the number of projects awarded on the PPP mode (refer to Figure 3).

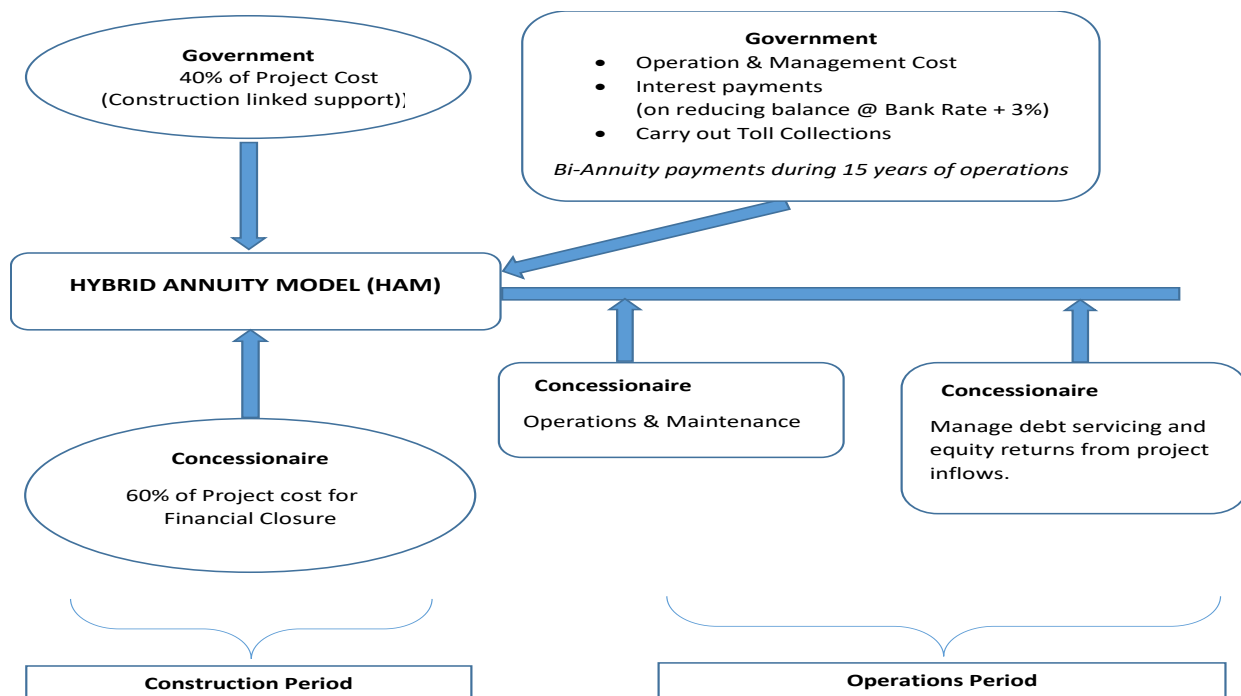


Figure 3 Block Diagram of the HAM Model as adopted by the Government of India.
 Source: The figure is primarily based upon the description of the HAM model provided by the Indian Government while giving its approval.

Despite the institutional maturity, the PPP mode of highway upgradation faced multiple challenges (Economist, 2012; Pratap, 2013 a,b,c; Pratap, 2015). These included opportunistic gaming by the private sector (Pratap, 2013a), the inability of government machinery to provide timely environmental clearances and encumbrance free land (Pratap, 2013b), incessant cost escalation, poor project visualization, and inability of the projects to navigate external economic shocks (Pratap, 2013c). To address these challenges, the standard concession agreement was tweaked multiple times.

Agreement clauses were modified with regards to conditions for site handover, signing of state support agreements, separation of operator and regulator, applicable specifications and standards, providing security to lenders, improving project supervision, conditions for allowing change in ownership, conditions to allow change in scope, addressing breaches in maintenance obligations, compensations for variations in traffic growths, and clauses for project terminations (refer to Ramakrishnan & Raghuram, 2012 for detailed description of the changes in each of these aspects). Moreover, the basic PPP model, financial viability provided by the toll, annuity payments or grants remained the same.

From the year 2012, the situation started to worsen (Ref to Figure 2 for trends). Increasingly, projects were stalled because the government was unable to fulfil its commitments for providing permissions and land in time (GOI, 2015). In some cases, the concessionaires walked away from projects where they had resorted to opportunistic bidding, as the global market slumped and toll revenues fell (GOI, 2015). With significant equity and debt capital locked into stalled projects, the flow of money into highway projects trickled down. Amid questions of the viability of the PPP concept in an emerging economy (Economist, 2012), public-private disputes became rampant with un-fulfilled promises from each side.

6.3 Project specific developments

Over time, the Indore city expanded towards Pithampur, and several residential colonies, schools, and hospitals developed around it. The hassle of commuting, though a concern, was no longer a significant issue. Simultaneously, numerous challenges also emerged and many industrial units shutdown and moved away citing poor infrastructure (Das, 2012). On the one hand, the newly setup industrial parks across the country attracted them with better infrastructure, special concessions, and tax holidays, while on the other hand, the deteriorating infrastructure of Pithampur (including Rau-Pithampur road) drove them away.

Numerous alternatives to the Rau-Pithampur road also emerged overtime. The toll road from Mhow to Ghatabilod, which allowed the defence area to be bypassed, was commissioned in 2001 (route OEAJD in Figure 1).^{xxvii} In 2009, the National Highways Authority of India (NHAI) commissioned a new four lane road as part of the national highway upgradation. This ran almost parallel to the Rau-Pitampur road. This was built to the best road standards in the country at that time (Class 1A standards) (route AJKCI in Figure 1). It was expected to become tolled in the future after resolution of some legal issues.^{xxviii} In 2015, another road section from Rau to Mhow was upgraded and commissioned as a part of the Rau-Mhow-Mandleshwar project (route DC in Figure 1). These roads competed with the Rau-Pithampur road for traffic.

7.0 Second Project

In an attempt to negotiate the numerous infrastructure issues plaguing the Pithampur industrial area, MPAKVN decided to take up upgradation of the Rau-Pithampur road to a four-lane divided highway in August 2013. The process was initiated by commissioning a study for a detailed project feasibility report (DPR). The study report by M/s AECOM, a professional engineering consultancy firm, made numerous important observations. Firstly, as the project road was now one of the four roads providing access to Pithampur, the financing model needs to account for the same in assessing the toll revenue capacity of the road. Secondly, with numerous residential options available in the vicinity and increasing availability of fuel efficient vehicles, transportation infrastructure was no longer a big concern for those working at the industrial park which would impact the traffic projections. Thirdly, the project scope was now well defined - as a single road of length 13.826 km to be upgraded at an estimated cost of ₹785.2 million. Lastly, the poor infrastructure investment climate prevailing in the country would make it difficult to attract private investment. The report argued that financial viability would need the provision of all the three options of toll, government grant, and

^{xxvii} The commissioning of the Mhow-Ghatabilod road is cited as one of the reasons leading to stagnant toll collection on Rau Pithampur road between 2001 and 2005. Shankar, Ramesh (February 3, 2006) Static toll collection raises eyebrows. Hindustan Times , Indore <http://www.hindustantimes.com/india/static-toll-collection-raises-eyebrows/story-KofgjXkpfE5FpY1Ar1tgL.html>

^{xxviii} A toll plaza was commissioned in August 2016 between Indore and Pithampur on National-Highway 3.

annuity payments, simultaneously. The existing PPP models did not allow for this. Such a model was being discussed for adoption even at the national scale, however as no road project had so far been bid out on this model and there lacked a precedent.

MPAKVN conceptualized this project as a BOT (Toll+Annuity) model with the grant. This model sought to amalgamate the conventional Build Operate and Transfer mechanism (with Toll or Annuity payments) with the conventional Engineering Procurement and Construction (EPC) mode. Herein, construction costs were shared between the government and the private concessionaire (in the 40:60 ratio). Bi-annual annuity payments from the government (capped at 5% of project cost) and toll collection by the concessionaire was to provide the returns against the 60% project investments brought in by concessionaire. The responsibility for construction, toll collections, and road maintenance during the operating period was attributed to the concessionaire. Bids were called for with the favoured bidder to be determined based upon the “lowest bi-annuity payments required by the concessionaires from the government.” The contract clauses of the concession agreement were formulated by combining elements from the model concessions agreements that had been standardized separately for toll, annuity and grant based projects.

The sole bid received during bidding was submitted by a consortium of local firms -- M/s Path Ltd (51% share) and M/s Third Eye Security Services Ltd. (49%), for bi-annuity payments of ₹69.6 million for 15 years. The concession agreement was signed on Sept 30, 2014, with a 15year concession period inclusive of 18 months of construction period. Financial closure of the project was achieved with a debt equity ratio of 70:30, recognizing the project cost as ₹ 914.45 million. The construction work was awarded to a local contractor as a fixed price fixed time contract of ₹ 750 million. The project was completed on target and toll collections started from March 27, 2016. The toll rate for four-wheeler cars was fixed at ₹10 for a one-way passage, which was the same as the toll rate that was being charged when the road was first tolled in 1993.

With the opening of this road, the first PPP project in the country was commissioned, employing a new PPP design that consisted of all the three features, i.e., an upfront government grant, toll collection rights, and bi-annuity payments from the government. A year later, the project was running smoothly, with toll collections above estimates, and bi-annuity payments being made by MPAKVN.

8.0 National Level Adoption of the New Model

At the national level, a PPP model like the one employed for the second project was approved for adoption in January 2016. This was a major adjustment to the conventionally used PPP BOT model with toll, grant, or annuity, which had been the dominant form for over two decades. The specifics of the national model differed marginally from the model used in the second project. The significant differences in the model were firstly the use of the net present value of the life cycle cost of the project as the bid parameter. Secondly, toll collections responsibility lie with the government, and lastly, the government bi-annually compensated the concessionaire for maintaining the road at rates quoted ex ante.^{xxix}

Fundamentally, the HAM model sought risk sharing in contrast to risk transfers in the earlier PPP models. This model attributed the project specific construction, design, operation and maintenance risks to the private sector, environmental risks of economy and demand to the government, and project financing risks shared among the two. It sought assignment of a significant proportion of project and demand risks to the government, with the recognition that the government was in a better position to shoulder them. Also, it sought to make both the public and the private sectors more responsible towards their duties by imposing numerous penalties for not fulfilling promises. By January 2017, 36 road upgradation projects costing over ₹300 billion (more than USD 4.3 Billion) had been modelled as HAM had been advertised, and 11 of these had achieved financial closure.

^{xxix} Compiled based on Circular no. NH-24028/14/2014-H(Vol-II) dated February 9, 2016. Hosted at the website of the Ministry of Road Transport and Highways, India. <http://www.morth.nic.in/showfile.asp?lid=1972> (Accessed April 28th 2017). Some inputs also from news report dated January 28, 2016. <http://economictimes.indiatimes.com/news/economy/infrastructure/government-approves-hybrid-annuity-model-for-highway-projects/articleshow/50740049.cms>

9.0 Comparative Case Analysis

Table 2 provides a tabulated comparison of the first and second PPP cases described above. Based on this tabulation a comparative analysis of the two cases is carried out motivated by the critical success factors identified by Wang (2015) as important for PPP evolution. The variables across which comparisons are made belong to three distinct categories – external environment, internal project characteristics, and partnership related factors (Wang, 2015). The descriptive comparisons are next presented.

Table 2 Tabulated comparison of the first and second PPP cases

ASPECT	FIRST PROJECT (1991)	SECOND PROJECT (2014)
Length	11.50 Km + 0.8 Km (Scope increase)	13.826 Km
Time	Conceived 1988-1991 Constructed 1991-1993 Operated 1993-2001	Conceived 2014 Constructed 2014-2016 Operated 2016-2031
Cost	Initial estimate: ₹1.8 Million. Commissioning cost: ₹ 68.3 Million	₹ 785.2 Million Under budget delivery
Project feasibility	Carried out on a need basis. Scope creep and evolving specifications.	Detailed feasibility studies, project assessment, and detailed project report prepared before the start of the bidding cycle.
Model	1990 – Financial lease (15% assured returns) 1991 - Project construction (16% assured) 1996 – Operational Lease (20% assured) Project structure changed overtime.	Hybrid Annuity Model 40% public + 60% private Bi-Annuity from government ₹ 69 Million + Toll collection by private
Basis for award	Memorandum of Understanding between government and IL&FS.	Two stage open bidding. The single bid received.
State Support Agreement	Land lease agreement.	A state support agreement was signed to get the state agencies involved.
Concessionaire	M/s IL&FS came as a financier and slowly adopted the role of a concessionaire.	M/s PATH bid for the project as a concessionaire.
Agreement	Tripartite Agreement. Favoured IL&FS.	Evolved Model Concession Agreement. Balanced arrangement.
Period	Construction: 100% time over-run 18□36 Months Operations: 10 years concession. 5 year extension subject to mutual review.	Construction within the stipulated time. Operations: 15 years concession.
Toll Rates	₹ 10 for the car. User reluctance to pay. Found the toll rates high.	₹ 10 for the car. Users are willing to pay the reasonable toll.

ASPECT	FIRST PROJECT (1991)	SECOND PROJECT (2014)
Supervision	Concessionaire as contractor, supervisor and auditor.	Independent engineer mutually appointed.
Change in scope and ownership	The agreement did not restrict change in ownership or scope. Scope and ownership change both changed.	Change of ownership restricted. Limits to change in the scope specified.
Breach in Maintenance	The initial agreement was for financing, and it did not get altered to include maintenance and operations clauses.	Operation and maintenance obligations of the concessionaire along with damages for breach and associated powers of MPAKVN have been defined in detail. Restrictions on project modification specified.
Variations in traffic growth	In case project costs did not get recovered by the 10 th year, mutual review stipulated. Increase in toll could be done with government approval.	Traffic variations to be accommodated in case traffic rose too much. Annuity reduction was specified if the toll revenues increased significantly.
Termination arrangement	IL&FS could raise a claim on MPAKVN if the project failed to give financial returns.	The extent of financial liability and right of each party clearly defined in case of termination. The concessionaire to be liable for all the defects and deficiencies 120 days after termination.
Arbitration clauses	Arbitration provided for, with the place of arbitration located at IL&FS headquarter location.	Amicable conciliation for dispute resolution. Arbitration as the second step, with the place of arbitration located at MPAKV's headquarter location.
Warranties and Guarantee	No warranty or guarantee clauses existed. As per the agreement IL&FS could not be held responsible for most of the project as it was a financier. Further, MPAKVN was made responsible for protecting the interest of the concessionaire.	Representation and warranties clearly spelled out, with disclaimer and performance guarantee to be provided by the concessionaire.

Source: Authors tabulation.

9.1 External environment

The economic, regulatory and institutional environment has a significant bearing on how PPPs evolve (Parker & Figueira, 2010; Verhoerts et al., 2015; Bayliss & Waeyenberge, 2017; Trebillock, & Rosenstock, 2015). Infrastructure demand, financial situation, political ideology, and relevant legislation constitute this environment (Wang, 2015).

Both the projects were experiments in public policy to address 'infrastructure deficit' – inadequate transport infrastructure of an industrial park. The first project aimed at seeking private finances for public infrastructure to satisfy a political vision - making "Pithampur" industrial park the "Detroit of India." Similarly, the second project attempted to upgrade the transport infrastructure to retain existing industrial enterprises operating in the industrial park and to attract new ones.

The first project was conceived at a time when government funds were scarce, and the project could not be taken up

by the government despite political will. In contrast, when the second project was taken up in 2014, the government was comfortable with finances, but it still saw value in exploiting private sector delivery. The political mandate further enabled the PPP conceptualization of the project and the shifting of infrastructure delivery responsibilities out of the public domain with increased private involvement for performance and efficiency gains (Parker & Figueira, 2010).

The user's willingness to pay service charges also constitutes the external environment of the project and is key to its development. While true globally, the user's willingness to pay user charges is especially hard to come by in an emerging economy context (Pratap, 2015b). Public transport provisioning being a fundamental government responsibility, transport concessions should achieve the social goal of providing affordable transport access to all levels of society, while also ensuring their commercial viability (Trebilcock & Rosenstock, 2015). The first project brings evidence of multiple local, and media conflicts originating out of the lack of user's willingness to pay. The users questioned the logic to pay for the use of a transport infrastructure that was built largely from tax payers' funds. As the first project took shape, the users accepted the rationale for payment of user charges, and the dispute shifted to the toll rates being charged. These rates were undoubtedly high in the first project.^{xxx} Such experiences in the first project made the government recognize the importance of levying reasonable toll charges and motivated it to subsidize the project.

At the time of first project's conception, PPPs were non-existent in the country, and the legislation recognizing private participation in public infrastructure did not exist. This discrepancy manifested during the arbitration stage when the legal validity of the tripartite agreement signed in the case of the first project was questioned. In contrast, when the second project was conceived, the state had already introduced and passed the necessary legislation, and it also had setup procedures for approval and sanction of PPP projects.

9.2 Internal project characteristics

Project specific financial, technical, execution and operational characteristics are the other key factors impacting PPP evolution. Specifically, the factors include financial viability of the project, the projects complexity, the completeness of the project conceptualization, and project management (Koppenjan, 2005; Wang, 2015).

The first project was taken up in an era when the global discourse on development argued for a shift of project risks and management to the private sector (Bayliss, & Waeyenberge, 2017). This inherently implied full commercial viability through toll charges with the toll revenues required to provide for the full project's cost. With the problem of high toll costs getting compounded with limited user willingness to pay, numerous disputes arose (Pratap, 2015). In the ensuing two decades, the users' willingness to pay increased and the government increasingly recognized that it, ultimately, remains accountable for the delivery of public services. With toll rates limited by alternate roads (competing roads), the complete commercial viability of the project based on toll revenues was considered infeasible. Consequently, the second project witnessed heavy subsidization by the government to enable reasonable toll rates.^{xxxi} While government grants covered 40% of the construction cost, the rest of the 60% of the project cost was reimbursed by the government in annuity instalments over the operational period.

The first project was seeking a complete transfer of project specific risks from the government to the private. It was akin to the handover of a bundle of risks to the private sector under the assumption that the private sector is more adept at handling them. The intervening decades and the numerous PPP failure stories overtime brought in the recognition, and a very important lesson, that the private sector cannot handle land acquisitions risks, government permissions risks, utility shifting risks and the demand risk in emerging economies. The new PPP model sought a reallocation of project specific risks, reassigning the key project risks associated with land acquisition, project demand, and government permissions back to the government.

^{xxx} With modest compensations for inflation at 5% the Rs 10/- toll charge in 1993 would stand today at Rs 75/-, while the toll charges imposed in the second project are Rs 10/- again.

^{xxxi} Ibidem.

The technical and execution characteristics of the project were challenging for the government's inhouse construction division in the first project. Hence the project was transferred to the private sector which had better construction and project management competencies. The second case demonstrates a mature project management environment, where the different project specific tasks were assigned to specialized entities. The project's successful (timely and within budget) construction reflects the benefits achieved by this maturity.

9.3 Partnership related factors

While PPPs are partnerships, the concept of partnership herein is often questioned (Hodge, Greve, & Boardman, 2010). Governed by legally vetted and court enforceable contractual agreements that crowd out trust, the essential element of a partnership – trust- is missing (Puranam & Vanestta, 2009; Moran & Ghoshal, 1996). Trust based relational contracting provides numerous advantages, economic savings being one of them, which PPP lose out on. Hence, there exists a need for partnership to develop in PPPs. This partnership in PPPs comes from relevant government capacity, private partner selection, role division among partners, and risk allocation among the partners (Koppenjan, 2005; Wang, 2015, Yang, et al., 2013). Comparison of the two cases in respect to these four factors is discussed next.

The two projects witnessed remarkably different government PPP capacity. When the first project was taken up, there was little clarity of what a PPP is. Evidence of the same lies in the contract being drafted as a financing lease agreement with government land guarantees, and simultaneously, linking project returns with toll collections and assured returns. Further, the first project was allotted to the lender/concessionaire on an unsolicited bid, in which the contractual clauses were heavily loaded in favour of the private sector. In contrast, by the time of the second project, the government had gained significant maturity through past experiences. Procedures for approval of PPPs, partner selection, and execution of projects were in place at both the national and the state level. The concept of unsolicited bids has been formally rejected by a high-level government committee (Government of India, November 2015). With the dedicated road development organization at the state level routinely taking up road projects on different PPP modes, PPP knowledge existed locally and it was also exploited in the formulation of the second project. Extensive experience of the state with PPPs brought a clearer understanding of the role and responsibilities of partners, and this was captured in the standardized concession agreements.

The first project evolved into a PPP by the year 1996. It was the transfer of tolling rights to MPTRL that made it into a PPP, though IL&FS had provided the funds, done the construction, and was also carrying out routine maintenance. The second project, in contrast, took shape when, MPAKVN, the client, signed the concession agreement with Rau-Pithampur Toll Roadways Ltd, a Special Purpose Vehicle (SPV) created for this project. The detailed project report preparation, project bidding, project financing, project construction and even toll collections were done by distinct and specialized third party business entities, reflecting the clarity in role allocations among the multiple project partners as the PPP environment developed.

The case descriptions also bring out that when the first project was taken up, there was little clarity about risk allocations. These evolved over the course of the project as discussed above. The lack of full understanding is evident in the ambiguity regarding approval of project costs by government managers – they first approved all scope and cost changes, and later refused to get associated. The project's cost escalation became the primary subject for disputes and figured prominently in both the arbitration and court proceedings. In contrast, the second project has so far not faced any significant issues, though it may be too pre-mature to comment with the project having just entered its second year of operation, after an on-time and under budget construction.

The cases bring evidence that the external environment for the Indian PPP projects has significantly matured over time in respect to user willingness to pay, legislative frameworks, project conceptualization and execution capabilities, and governments capacity in handling PPPs. It also emerges that the PPP models have also evolved to bring about increased involvement of the government, both, financially and operationally. A more equitable distribution of risks among the government and the private concessionaire is attempted and/or adequate compensation for the shouldered risks provided. The learnings from the two road projects are next discussed.

10.0 Road Learnings

The PPP phenomenon, as a policy imperative, inherently faces issues in how it is defined (Hodge, Greve, & Broadman, 2010). It is fundamentally contested as a concept (Klijn, 2010), and it lacks robust implementation and governance frameworks (Davidson, 2010). The case comparison provides evidence of the same. Further, tracing the development of PPPs over two and a half decades, the comparisons give unique insights into how highway PPPs in India have evolved overtime regarding motivations, model evolution, institutional capacity and performance aspects. Each of these is discussed next in light of the existing literature. Table 3 provides a tabulated view of the discussions.

10.1 Motivation

PPPs attempt to attract private investments to cover public infrastructure gaps. However, the evolution of PPPs in emerging economies has led to numerous contradictions (Bayliss, & Waeyenberge, 2017). Firstly, they are argued to absorb scarce public funds that could have been possibly freed up for poverty eradication. Secondly, whereas they aim to compensate for weak state capacity, instead they put extra demand on it. Thirdly, rather than substituting public investments they increase them, in a bid to attract investors. The reluctance of private investors to invest in public infrastructure motivates these contradictions. Private investments do not come forward unless public investments are first made (Bayliss, & Waeyenberge, 2017). The case comparisons resonate with all the above arguments and provide evidence of the same. In contrast to the first project, the evolved HAM model in the second project involves investments of significant public funds, and the government is saddled with significant project risks.

Table 3 Theoretical Comparison of the projects. *Source: Authors tabulation.*

Project	Description	Project timeline	External Environment	Internal project Characteristics	Partnership related factors	Learnings from project
First Project	First PPP – Evolved from a private leasing arrangement to PPP	<p><i>Conception:</i> 1990 <i>Construction:</i> 1991-1993 <i>Full private transfer:</i> 1996 <i>State takeover:</i> 2001</p> <p>Disputes continue</p>	<p>Indian started to open its economy in 1991; State had no money; Extremely poor infrastructure - development a concern, road essentially required; Politically desired; Attract private money; Outsource to leverage private delivery efficiencies; Few private firms present; No relevant legislative guidelines; Public reluctant to pay toll.</p>	<p>Full private financing conceived; Cost escalations made the project financially unviable; Complex project for the time; No preliminary project design. Scope increased; Contract documentation poor; Project management, financing, construction and operations all with single private agent.</p>	<p>Government has no PPP capacity; Unsolicited offer from private partner accepted; Assured returns and guarantees given; Role allocations changed over time and so did the risk allocations; Contractual adjustments and critical evaluation of these changes not done; Opportunistic behaviour by private sector</p>	<p><i>Motivation:</i> An essential infrastructure <i>Project Design:</i> Inadequate preparation leads to cost over runs, gold plating of projects, scope for opportunistic private behaviour – public has to ultimately bear this cost; Conflict of interest if unchecked lead to disputes. <i>Institutional support:</i> Government agencies require training and help in understanding PPPs; Ambiguity in policy is exploited by private and government both. <i>Performance measure:</i> Infrastructure delivery.</p>

Second Project	<i>First experiment with a new model</i> – An evolved model of risk sharing with government grant, tolls and also annuity payments.	<i>Conception:</i> 2014 <i>Construction:</i> 2015-2016 <i>Operations:</i> Till 2030	Boost to industrial development required; Project politically desired; Project a small cost for government; After an exciting decade journey of roads PPPs, private sector was no longer investing in infrastructure; Banks reluctant to lend as they had large infrastructure non-performing assets; PPPs quite common and legally recognized; 4 competing roads reduce tolling potential; Public acceptance to pay reasonable toll.	Government has resources; Wants private finance to drive efficient delivery; Evolved financing with government support to make project viable at affordable toll rates; Project well defined; Mature contractual clauses; Professional third party project management.	Improved government capacity financially and technically; Open bidding; Standard concession agreement documents defining clear roles and responsibilities; Continuous interaction of public-private required, mediated by independent consultant.	<i>Motivation:</i> Affordable public transport infrastructure that is also financially sustainable. <i>Project Design:</i> Process matured with professional pre-project documentation, independent project supervision, construction on fixed cost by sub-contractor, distinct toll operations. <i>Institutional support:</i> Mature environment with standard documents, PPP experience and risk allocation. <i>Performance measure:</i> Concerns about ongoing public-private interaction; Over compensation of risks.
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A key motivation driving the resurgence of PPPs in emerging economies is traced to the increasing availability of global finance (Bayliss, & Waeyenberge, 2017). While the single case data points of the study cannot be interpreted as credible evidence for or against, such a possibility is unlikely in the Indian PPP market. Institutional investors and banks have been hesitating to fund HAM conceptualized projects.^{xxxii} The newly emerged HAM model, with significant government involvement, does not align well with investor's interests. Further, there is an increasing awareness that the government is ultimately responsible for the infrastructure delivery, whether directly or through PPPs (GOI, 2015). Government is getting reoriented towards taking up its share of risks in the project.

10.2 Project Model

The first project, when conceptualized, attempted to emulate the UK PFI model (Parker & Figueira, 2010). However, a financial lease contract was signed as there was little understanding of PPP nuances. The project evolved into a PPP over time, when the project risks were transferred from the government to the private agency. With experience of over 700 PPP projects, the Indian highway PPP market has matured. A sound understanding of the PPP models now exists and the same is demonstrated in the evolved HAM model. Table 4 compares the risk allocations in the six kinds of PPP models that are discussed in this study.

Table 4: Comparing the risk allocation among partners in the different risk sharing modes in transport infrastructure upgradation.

Risk	EPC	BOT Toll	BOT VGF	BOT Annuity	HAM Case	HAM Model
Design risk	Govt	Pvt	Pvt	Pvt	Pvt	Pvt
Construction risk	Govt	Pvt	Pvt	Pvt	Pvt	Pvt
Finance risk (Project)	Govt	Pvt	Pvt+Govt	Pvt	Pvt+Govt	Pvt+Govt
Finance risk (External)	Govt	Pvt	Pvt	Pvt	Pvt	Govt
Demand Risk	Govt	Pvt	Pvt	Pvt	Pvt+Govt	Govt
Toll Operation	Govt	Pvt	Pvt	Pvt	Pvt	Govt
Maintenance Risk	Govt	Pvt	Pvt	Pvt	Pvt	Pvt

^{xxxii} The press report identifies some of the issues raised by the banks. <http://economictimes.indiatimes.com/markets/stocks/news/banks-say-theyre-not-willing-to-fund-roadworks-under-hybrid-annuity-model/articleshow/57119145.cms>

Govt: Government; Pvt: Private; Pvt+Govt: Shared risks

EPC: Engineering, Procurement, and Construction; BOT: Build, Operate, and Transfer; VGF: Viability Gap Funding; HAM: Hybrid Annuity Model *Source: Authors tabulation*

It is contended that the developments and evolution of PPP models is key to both their emergence and success. The increased participation of the government in HAM has evolved because of numerous reasons. Firstly, a significant number of PPP projects became distressed between 2010 to 2014 due to delays in land acquisition and environmental clearances which increased project costs, and reduced the toll collection periods. Secondly, the global economic slowdown led to a fall in the demand and led to financial distress in some PPP projects. This was the biggest concern in projects that had been bid opportunistically. The poor demand materialization compounded the problems and exit from the project by the private player with equity loss was inevitable. The projects were left in the hand of the lenders, who were invariably public sector banks. Hence, the government was forced to take over this large debt, which is now existing as non-performing assets on the balance sheets of banks, many of which are owned by the government. This motivated the government to consciously decided to step in and assume the risks *ex ante*, rather than be saddled with non-performing assets on its entities balance sheet, later.

The above arguments are in line with Wang (2015)'s PPP evolution framework, wherein changes in the critical success factors were argued to drive PPP model evolution. The success factors for PPPs in India have evolved from a situation where the government was desperate to attract private finance to a situation where it is comfortable financially. It has evolved from handing over of public assets to private for management to working with the private to drive efficiency. These changed factors have brought about changes in risk allocations, and hence changes in PPP models.

The newly evolved models require close working between the government and the private, which is fundamentally riddled with tensions (Klijn & Teisman, 2003). In a study of infrastructure projects in Netherlands they found that this tension was resolved by discriminately allocating responsibilities to the two parties, with little over laps. The initial PPP projects in India represented the same. With a focus on sharing risks rather than transferring them, the HAM model fundamentally intermingles responsibilities and hence, increases the role of management at the public private interface. If deliberate attempts at management are not initiated in time, the tensions at the public – private interface have the potential to derail PPPs (van Gestel, Koppenjan, Schrijver, van de Ven, & Veeneman., 2008). This emerges as a key recommendation for practice from this study.

As a new model, HAM has its share of issues and problems (CARE, 2016; CRISIL, 2016). Firstly, it is complex as it envisages a complicated calculation of the project's net present value to ascertain the lowest bidder and this requires numerous assumptions about the discounting rates and inflation rates. Secondly, it may be poor at driving private efficiencies as it provides for minimal private sector equity exposure and little private "skin in the game". Thirdly, it loses out on toll collection efficiency advantages by allocating toll collection to the government. Some industry experts even question the hybrid nature of the new model as majority of the project risks have now been allocated back to the government. They see the HAM model as reversion back to the traditional (Engineering, Procurement, and Construction) model of infrastructure delivery, from where the industry started three decades back. For these and similar reasons, banks and institutional financiers were also hesitant in extending them debt finance.^{xxxiii} They argue that the model did not bring the long-required clarity regarding the "debt due" at different life cycle project stages, nature and extent of government guarantees, and government accountability provisions. The model is argued to have become complicated, with a significant exposure to interpretations by the public managers, and requiring extensive public private interactions, which have been a source of numerous disputes in the past.

10.3 Institutional Capacity

Maturity in institutional and regulatory capacity is one of the key success factors of PPPs in emerging economies.

^{xxxiii} Ibidem.

This maturity comes in the form of improvements in project preparations, maturity of contractual terms and conditions, transparency in procurement process and most importantly institutional capacity (government PPP capacity) (Trebilcock, & Rosenstock, 2015).

The case comparisons provide evidence of evolution and learnings in all the above aspects. Each of these has contributed to the success of the second project. Evidence of the same is also reflected in India emerging on the top in the Asia Pacific region in “Operational Maturity” for PPP projects (Economic Intelligence Unit & Asian Development Bank, 2015). It has also fared better than the developed markets of UK and Australia that were also benchmarked in this study.

10.4 Performance

PPPs in emerging economies derive performance advantage from efficiency improvements, construction cost control, and infrastructure access that they provide (Trebilcock, & Rosenstock, 2015). The successful execution and operation of both the projects confirms that PPPs are a viable option for addressing the infrastructure gap in an emerging economies (Hodge, 2010; Kwak, Chih, & Ibbs, 2009). The improvements and evolution in the partnership related factors can be traced as the key driver for this, and is evident from the case comparison. That is, an emphasis on pre-planning, project management and the maturity in construction practices has paved the way for the associated construction risks to be adequately addressed.

Bundling of construction and operations activities is fundamental to driving performance in infrastructure concessions, as the private construction investments are proposed to be recovered during the operational phase through user charges (Hart, 2003). This bundling and its resultant advantages require a life cycle assessment of the project (Boardman & Hellowell, 2016; Boardman, Greve & Hodge, 2015). While no such assessment was done during the conceptualization of the first or the second project, the adopted HAM uses the net present value of life cycles costs as the bidding criterion. This bidding criterion seeks to achieve project sustainable and viability over its full life. It is an attempt at addressing the fundamental issues, in a context where Value for Money (VfM) analysis is not the norm (GOI, 2015).

Global evidence in support of performance achievements in PPPs is doubtful (Trebilcock, & Rosenstock, 2015). The second project provides evidence of marked improvements in the construction cost control and access to infrastructure. Additionally, it also provides evidence that in the context studies the state is attempting to fulfil its basic social goals by significantly subsidizing access and not leaving it to the private sector to bring in full-cost recovery pricing that is a recipe for PPP failure (Trebilcock, & Rosenstock, 2015). The unsuccessful attempts at full cost recovery in the first project provide evidence that this may not be a viable option.

11.0 Conclusions

This paper carries out comparative case study analysis of two road upgradation projects, on the same stretch of road, taken up at an interval of 25 years. It makes numerous theoretical and empirical contributions while studying the evolution of PPPs in the Indian highway sector. Theoretically the study makes contribution to the literature on PPP evolution. Firstly, the study complements Wang (2015)’s study of PPP evolution of American Roads by partially replicating it in an emerging economy context. Significantly different from Wang(2015)’s study, this is the study of a natural experiment. The study finds the critical success factors of PPP to lie in external environment, internal project characteristics and partnerships related factors, as proposed by Wang (2015). Secondly, the study identifies a need for scholars to move beyond attributing PPP development in emerging economies solely to maturity in institutional capacity. This aspect has dominated emerging economy studies till date (Trebilcock, & Rosenstock, 2015). Thirdly, innovations in the PPP model were found to bring about revitalization of PPPs in the Indian highway sector. The innovative changes in the PPP models were found to be driven by the governments increasing willingness to shoulder higher levels of financial and project risks in the project. This observation contrasts with the argument that availability of global finance drives PPPs in emerging economies (Bayliss, & Waeyenberge, 2017). At a broader policy level, this reflect that the emerging economies have a lot of heterogeneity among them and claims of sweeping trends in their development path may be mis-founded.

At the methodological level, a natural experiment is studied employing comparative case analysis. With PPPs being a relatively recent phenomenon, few such contexts exist for study. This makes the contributions of this study to the PPP literature salient. The methodology used enables tracking of changes over time, which is a “major strength of case studies-which are not limited to cross-sectional or static assessments of a particular situation” (Yin, 2013, p. 113). The cases chosen for the study were unique as they mark the two extreme points of one of the most successful transport PPP programs in the world. One evolved into the first PPP project in the country, while the second captures the essence of recent policy developments. Hence, the context studied is an ideal one for study of evolutionary developments.

The study suffers from the standard case study limitations. The sample size is two. As a study of evolution this may not be a major concern, however the findings of the study may lack generalization. Further research is required to subject the findings to large sample tests, and study how institutional maturity, global finance, and PPP model changes simultaneously and independently impact PPP success across sectors and nations. The second key limitation of the study is the focus on a small road project. PPP projects in the road sectors are generally high valued projects -- the average cost of highway PPPs presented in Figure 1 is ₹ 6 Billion compared to the second project’s cost of ₹ 700 million. Hence, the project specific findings may not be generalizable to large projects. It is duly recognized that the study could have possibly missed out issues relating to complexity and size in large projects. However, considering that the projects studied have had national repercussions, their small size may not be a big concern from the policy perspective.

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