Chapter 12
Public Provisioning of Infrastructure Changing Strategies: Empirics of India

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1 Introduction

It is not an overemphasis when we say that a solid infra base forms the backbone of economic growth of a country, considering that an adequate provision of infra services and regular maintenance of such services are absolutely essential in sustaining economic growth and harvesting the full potential of the various sectors of an economy. In the contemporary context of globalization and liberalization, it has become increasingly difficult for governments, particularly in the developing world to meet the rapidly increasing infra demand. Hence, as part of addressing this growing infra gap (difference between supply and demand), public–private partnerships have emerged as an effective alternative strategy across the globe since the 1990s.

In brief, public–private partnerships (PPPs) are broadly an alternative to the public budgeting in the provision of infra services. Under this mode, government investment in infra services is replaced by private investment for the creation of a new infra base as well as maintenance of such infra services. Typically, the infra services are created, maintained and operated partially or fully as an alternative to the traditional public budgeting.

Against this backdrop, the present study deals with theoretical strands of argument related to PPP as an alternative to public budgeting of infra services in Sect. 2. Section 3 explains briefly the various policy initiatives undertaken by the Government of India towards enhancing infra investment through PPP mode. Section 4 traces the growth of public and private sector investment and trends and patterns with respect to various infra sub-sectors in India. Section 5 comes up with a performance analysis of infra PPPs in India, followed by a summary of the study in Sect. 6.

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2 Theoretical Expositions for an Alternative to Public Budgeting of Infra Services

Infrastructure sector is traditionally a public good, typically provided through the mode of public budgeting. However, massive infra needs, fiscal constraints, increasing public debt and fiscal consolidation, and many more factors have led to the development of an alternative to the traditional public budgeting strategies with respect to the provision of infra services. The following section describes briefly the important theoretical support for an alternative to the public infra budgeting as far as infra provision is concerned.

2.1 Infrastructure as an Impure Public Good

The routing of infrastructure services partially through the private sector lies in the impure characteristic of a public good, i.e. rivalry a situation of (one person's consumption limiting the consumption of others) and excludability (restricting/excluding others from using it when being used by one or more). These characteristics provide a fair scope for the private sector in terms of providing infrastructure services.

But the impure public good[1] nature of infrastructure, welfare aspect and its basic needs character, long gestation, and lumpy investments can make it almost impossible for the private sector to participate. However, the present state of governments' finances, technical and managerial expertise, etc., does not permit the government/public sector organizations alone to overcome these infrastructural bottlenecks. This can give rise to the amalgamation of both the public and private sectors in providing infrastructure services.

Dailami and Klein (1997), in the empirical study, explain the necessity of opting for private sector participation by governments in the developing countries in the creation of an infra base in the view of the debt crisis faced by the developing countries in the early 1980s that significantly restricted public borrowing for averting the debt crisis projects. The authors argue that governments can attract private sector funds in infrastructure provision in two ways: first, by way of providing financial assistance in the form of grants or guaranties or cheap loans and, second, by way of rendering the required policy support. This, they argue, protects the private investor concerns by ensuring macroeconomic stability and sound regulatory setups for facilitating and ensuring private sector investment in the infrastructure build up.

Besley and Ghatak (2001), while developing a framework with regard to the role of the state and the non-governmental organizations (NGO)/voluntary sector in the public projects, argue that incomplete contract results are subject to delays in investments and also that the ownership of public goods should rest with the party that cares most for the project. Their framework, while explaining how the private

[1] Impure public good—varying levels of rivalry and excludability principles are applicable.

sector can be involved in the provision of public goods, elucidates that the degree of impurity associated with goods or services determines the extent of private sector participation.

Francesconi and Muthoo (2004), in their theoretical work, while examining the non-rival and non-excludable nature of pure public goods, argue that most public goods are impure and that their ownership depends on the degree of impurity (i.e. rival[2] and /excludable[3]) associated with goods or services; i.e., when the degree of impurity is high in respect of public goods, then the ownership should be with the private sector and vice versa. They propose a joint ownership in respect of two cases, i.e. first, when differences exist in the valuation of impurity of public goods and, second, in the context of similar productivities of both the public and private sectors.

These two theoretical strands of argument arrive at an identical proposition that the level of private sector participation in infrastructure projects is determined by the degree of impurity, i.e. rivalry and excludability and the nature of technology required with regard to those goods or services. The present study presumes that one of the grounds for differing PPP types/models is the varying levels of public good characteristics present in various types of infrastructure services such as transport (roads, railways, airports and ports), urban infrastructure, health, and education sectors. Further, this difference of impurity of public good character may differ within the sector too and is project specific based on the geographic and demographic factors. Hence, there exist different PPP models that are employed within the same infra sub-sector.

2.1.1 Efficiency Grounds

Leibenstein (1966) empirically verified the argument that a monopoly situation in the provision of goods or services may lead to welfare loss and that competition in providing goods or services enhances the efficiency. PPP model, that enables a competitive provisioning of infrastructure services with the participation of private and public sectors, is expected to enhance efficiency. More importantly, this process of PPP infrastructure provision may eliminate the natural monopoly power of the public sector. The entry/participation of the private sector in the infrastructure provision expands competition which, in turn, leads to an improvement in various economic efficiencies. A lower degree of competition facilitates a greater allocative efficiency, while a higher degree of competition results in an increase in X-efficiency. Leibenstein specifies three important elements, namely intra-plant motivational efficiency, external motivational efficiency and non-market input efficiency for determining X-efficiency.

Lindberg study (cited from Leibenstein 1966) argues that in respect of industries, a sub-optimal disequilibrium (with respect to technology and utilization of capital

[2]Rivalry—refers to a situation where a good consumed by 'X' person is not available to 'Y' person.

[3]Excludability—refers to a situation where, in providing a given service to 'X' person, there is a possibility of 'Y' person getting excluded from accessing the given service.

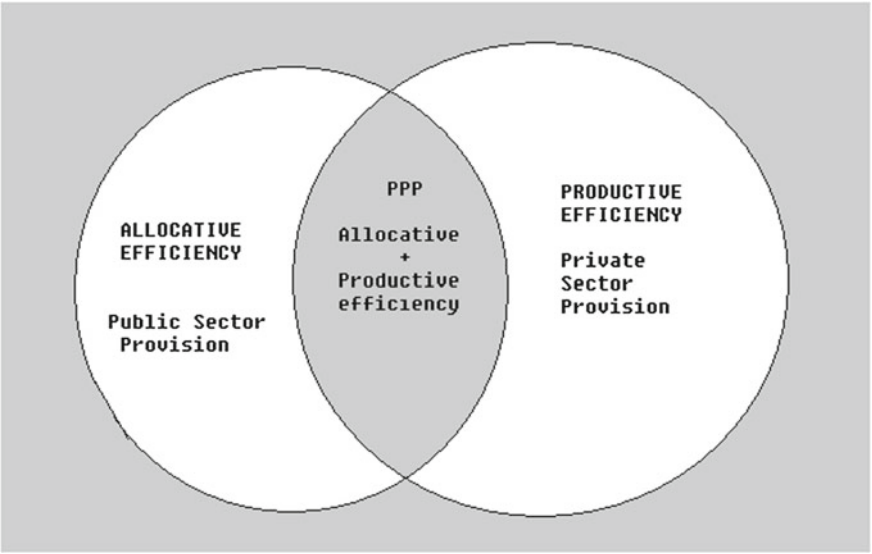

Chart 1 Efficiencies in various forms of infra services provision. *Source* Nagesha (2015)

stock) occurs mainly because of under-motivated managers and workers and that this situation motivates employees to move further away from an optimal equilibrium. While supporting this view, Fredrick Harbison (cited from Leibenstein 1966, p. 8) points out that the absence of motivation on the part of the management of one of the petroleum refineries in Egypt resulted in the operation of the nearly half of the other refineries for several years. However, an improved motivation (on the part of the new management team in the respective company with the same employees) tremendously enhanced its productivity. Thus, what the above case implies that managerial efficiency can result in an optimal growth. PPPs may be one of the strategies wherein private managerial efficiency can increase the potential use of input productivity with dynamic changes in the infrastructure sector in the long run.

The private sector is efficient in technological, managerial and risk managing aspects, while the public sector is efficient in allocative and financial aspects; i.e., the cost of public sector financing is less as compared to the private sector financing. Therefore, a blend of these two sectors may result in an efficient provisioning of infrastructure services.

Schmidt (1996), while supporting the X-efficiency theory, defines the trade-off between public and private ownership as follows: "Although the private sector provision generates a higher productive efficiency, the public sector provision generates a greater allocative efficiency. Both allocative and productive efficiencies increase simultaneously under PPPs. The public and private sector combination increases the total efficiency of a project". This is graphically explained in Chart 1.

PPPs function as co-producers between the government and private sectors under which the goal is achieved by the surplus value. Erik-Hans et al. (2005) explain that a

mere partnership between government and private sectors will not create any surplus value, but a proper synergy between government and private sectors creates positive externalities, resulting in "*metaphorical formula* ***1 (public) + 1 (private) > 2***" (cited from Yin 2009, August 20, p. 1).

Hammami (2006) argue that inefficiencies prevailing in the public sector organizations led to the emergence of the new public management mechanisms in the UK and other countries towards improving the management of the public sector, having been prompted by the need to reduce public spending and to overcome the lack of managerial skills and efficiency associated with the public sector organizations.

2.1.2 Principal–Agent Theory

The mixed economy character of the Indian economy provides an opportunity for the existence of both the public and private sectors in providing infrastructure facilities. Under PPPs, the public sector is expected to perform as a regulator, facilitator, guide and philosopher to the private sector for the purpose of providing adequate infrastructure services.

Hence, the public sector needs to behave like a principal or a regulator in order to look after the welfare aspect of the general public by ensuring a ready accessibility to infrastructure facilities, while at the same time, ensuring minimum rates of return on investments and a favourable investment climate for the private sector.

If both the public and private sectors are able to function in tandem as the principal and agent, then one can expect a smooth and adequate provision of infrastructure services.

2.2 Public Debt: A Major Factor

With the nature of governments changing, their natural monopoly status came under an increased scrutiny, demanding a change. The debt crisis forced the governments to look for alternatives. The public debt crisis of the early 1980s in the developing countries significantly restricted public borrowing, forcing them to look to private infrastructure projects, as a possible alternative option, so as to avoid a major macroeconomic crisis (Dailami and Klein 1997). The study suggests that governments can attract private sector funds in infrastructure provision in two ways: first, by way of providing financial assistance in the form of grants or guaranties or cheap loans and, second, by way of extending the required policy support. This could protect the interests of private investors by ensuring macroeconomic stability and sound regulatory setups for facilitating and ensuring private sector investment in the infrastructure build up.

3 Government Policies Towards the Promotion of Infra PPPs

India has emerged as one of the leading nations with the largest number of infra PPPs in the world. As part of addressing the various infra bottlenecks and promoting PPPs, both the Central and State Governments have initiated many policy measures at the aggregate and sectoral levels.

Box 1: Timeline of Important Policies, Committees and Institutions for Promotion of PPPs

1996 – Rakesh Mohan committee on infrastructure financing
1997-2002 – 9th Five year plan - exclusively focussed on infrastructure- private sector participation through PPPs
Committee on Infrastructure (COI) - August 2004
Cabinet Committee on Infrastructure (CCI) – July 2009
To address the construction time and cost overruns – all NHAI's from phase III started development through BOT PPPs
2005 -Public Private Partnership Approval Committee (PPPAC)
2006- VGF- Viability Gap funding (VGF)
Empowered Institution (EI) / Empowered committee – To approve VGF
2006- India Infrastructure Finance Corporation Limited (IIFCL) - for innovative, cost effective methods of financing infrastructure projects.
Public Private Partnership (3Ps) Institute proposed in the 2014 union budget for promoting PPPs in the county by the Finance Ministry, GoI
Vijay Kelkar committee to revisit and revitalise the infra PPPs (May 2015)

Source Nagesha (2015)

The present section makes an attempt to track the policy impacts of governments and to critically analyze various vital policies both at the national and sub-national levels.

GOI has introduced, from time to time, many fiscal measures through formulation of special policies, establishment of institutions to address issues related to various infrastructure inadequacies and also (briefly specified in text Box 1) to encourage the private sector participation in this sector.

3.1 Fiscal Incentives to Infra Investment

In this direction, the GOI, in the 1996–97 budget, had announced several incentive measures regarding infrastructure promotion. These included mainly fiscal incentives like 'five-year tax holiday' for companies engaged in developing, maintaining and operating infrastructure facilities such as roads, bridges, new airports, ports, railway tracks/lines, and water supply, sanitation and sewerage projects. Secondly, income tax exemption was extended to dividend, interest or long-term capital gains earned by funds or companies set up to develop, maintain and operate infrastructure facilities. Thirdly, to augment resources, the government enhanced tax rebate limits so as to help channelize domestic savings into debentures and shares of infrastructure companies in the specified sectors. Fourthly, to provide long-term finance for infrastructure development, the government established Infrastructure Development Finance Company (IDFC) on 30 January 1997 with an authorized share capital of Rs. 5000 crore. Fifthly, the government relaxed many legal administrative procedures related to foreign investments in the infra sector by allowing foreign equity participation up to 74% in key infra sectors. Sixthly, the government obtained a loan of $300 million from ADB to help develop a long-term debt market and to support private sector infra investment projects.

With respect to sector-specific reforms, the GOI (1997) initiated the following vital measures. First, the GOI extended all the fiscal incentives to telecom projects by treating telecom sector as part of the infrastructure base. Secondly, it allowed the private sector into electricity transmission by amending the Indian Electricity Act 1910 and Electricity Supply Act 1948. Thirdly, the government introduced the Build-Own-Lease-Transfer (BOLT) and Own Your Wagon Scheme (OYWS) as part of facilitating the private sector participation in railways.

Viability Gap Funding (VGF): In order to support socially important, but economically unviable infrastructure projects, the GOI initiated a special scheme called VGF in 2006. For projects which are justified by socioeconomic returns, but do not pass the standard thresholds of financial returns, VGF is inevitable. Under VGF scheme, grant assistance up to 20% of the capital cost is provided by the Central government to PPP projects undertaken by any Central government ministry, state government, statutory entity or local body. An additional grant of up to 20% of the total project cost can also be provided by the sponsoring ministry, state government or project authority. For the national highway projects, the entire VGF is provided by National Highway Authority of India (NHAI) from the cess revenues transferred to it by the government.

Viability Support Fund (VSF): In the 12th FYP, it was envisaged that VSF financing both capital investment (capex) and recurring costs (opex) incurred by non-governmental agencies in the delivery of services to economically weaker section (EWS) families be reimbursed by the Central and State governments through VSF, based on the terms of concession agreement between the government and non-governmental entities.

Model Concession Agreements (MCAs): The GOI has evolved elaborate guidelines with a view to facilitating a hassle-free implementation of various infra projects. These include specific MCAs for the various infrastructure sector and sub-sectors, model bidding documents, project handling toolkits, standard concession agreements and regulation guidelines. These documents are meant to guide project initiating departments at various stages of project formulation and execution as also to avoid unnecessary disputes and to fix responsibilities for various tasks, etc., over the entire lifespan of the projects.

3.2 Infra Policy Measures for Sectoral and Regional Inclusion

As part of achieving the objective of a 'sustainable, faster and more inclusive growth,' the 12th FYP envisaged the adoption of PPPs in many sectors including social infrastructure.

Chart 2 specifies briefly the infra sub-sectors chosen for PPPs both by the national and sub-national governments. In addition to the traditional sectors (mainly transport), the government intends to promote PPPs in the social sector. This is discussed in the following paragraphs.

PPPs in the Social Sector: The 12th FYP lays a special emphasis on the social sector development in that it aims at reaching the fruits of development to the underprivileged sections of the society. The plan highlights that the limited available public domain resources are insufficient to achieve the physical targets envisaged and that the participation of the private sector is essential to bridging the resource gap. The private sector investment in the social sector under PPPs is aimed at '*reduction in time*

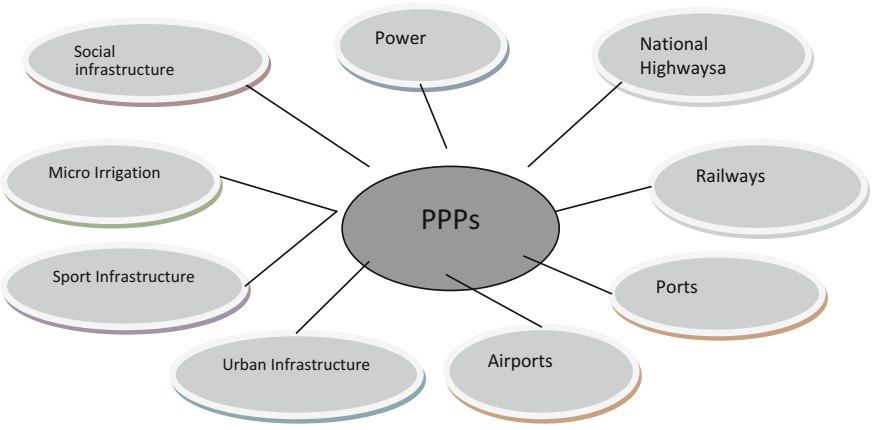

Chart 2 Infra PPPs across various sectors in India. *Source* Nagesha (2015)

and cost over-runs, improvement in efficiencies and better quality of performance' (GOI 2013a, p. 96).

PPPs in Education: The government plans to set up 2500 schools under PPPs during the 12th plan. The main objective of this program is to provide quality education to the underprivileged children (who cannot afford to pay fees charged by 'good' private schools). This scheme has a vision of providing quality education to 40 lakh children, including 25 lakh children belonging to the underprivileged sections of the society.

Government initiative in terms of adopting PPPs in education is very much timely as it is in line with its vision of providing world class quality education to the low-income families. The guidelines under the scheme make it clear that the government's policy formulation for improving the quality of education by identifying schools (under the respective scheme) is based on the previous track record of applicants, not on financial bidding. The mode of payment for such schools is also very clear. Hence, one has to wait for the actual implementation of the government initiative in this direction and its potential impact in terms of providing quality education to the hitherto marginalized sections.

PPPs in Healthcare Services: The objective of this scheme is "to create a health care delivery mechanism comprising multi-specialty hospitals to meet the growing health care needs of the poor, and for supplementing human resources in the sector by setting up nursing schools and medical colleges" (GOI 2013a, p. 97).

Under this program, the government aims at creating secondary and tertiary care hospitals through PPPs at the district level. A 200-bed district-level hospital would serve a catchment area of about 8–10 lakh population (20 lakh for a 300-bed tertiary care hospital). This scheme envisages providing a ready access to quality health care to the economically disadvantaged groups through tertiary/referral hospital setups.

PPPs in Sports Infrastructure: The objective of this initiative is "to utilize the existing facilities optimally throughout the year and also generate revenues for their operation and maintenance" (GOI 2013a, p. 95). The Planning Commission has also developed a model for operation and management of sports infrastructure through PPPs in consultation with Ministry of Sports and Youth Affairs. It is proposed to take up the sports infrastructure already existing as well as new stadia.

PPPs in Food Grains Storage: The government has also initiated steps to enhance 'food security, reduce wastage and to improve the quality of stored food grains' through PPPs. Under this program, the government plans to create 2 metric million ton (MMT) of modern storage facilities in the form of silos in the first phase. Silos will be constructed and operated through PPP mode in various states across India. The government also intends to contribute up to 20% of the cost of construction of storage silos to private entities under the concession agreement. The concessionaires are entitled to receive recurring storage charge, for assuring a required performance and maintenance standards.

Green Highway Policy: The GoI recently (29th September 2015) announced the green highways policy 2015. The policy broadly aims at developing eco-friendly national highways through plantation, transplantation, beatification and maintenance of trees across the national highway corridors. The policy also aims at making these

roads more user-friendly by way of reducing the adverse impacts of air, dust and noise pollution and also making roads glare-free in the summer. The policy also aims at an investment of Rs. 1000 crore every year besides bearing one percent of the total project cost with respect of the implementation of the respective scheme. In addition to tree plantation, a regular monitoring of them will be taken up with the help of ISRO's Bhuvan and GAGAN satellite systems. This policy is expected to encourage the participation of local communities, farmers, private sector, NGOs and government institutions in the implementation process.

4 Sectoral and Regional Spread of Infra PPPs

The entire world including India has come to adopt PPPs as a mode of infra provision. This typically includes the maintenance of already existing infra services or a new creation and operation of various economic and social infra services. And as such, it is vital to analyse the trends and patterns in infra PPPs at the national and sub-national levels to understand the basic factors underlying such a development.

In India, 1437[4] PPP infrastructure projects with a total investment project cost of Rs. 9,27,819.5 crore have been developed by both the Central and State governments. These projects[5] include broadly five infra sectors, namely transport, energy, communication, water and sanitation, and social and commercial infra sectors. These infra sectors are further categorized into roads and bridges, ports (excluding captive), inland waterways, airports, railway tracks, tunnels, viaducts, bridges, while the urban public transport comprises transport sector category. Secondly, energy sector projects include electricity generation, renewable energy, electricity transmission, oil pipelines, oil/gas liquified natural gas (LNG) storage, gas pipelines and city gas distribution. Thirdly, communication sector includes telecommunication towers. Fourthly, water and sanitation sector consists of solid waste management, water supply pipelines, water treatment plants and sewage collection, treatment and disposal system, irrigation, storm water drainage. Fifth and finally, social and commercial infra sector includes common infrastructure for industrial parks, special economic zones (SEZs), cold chains and PPP only projects in the sub-sectors like hospitals and educational institutions and tourism sector infra projects.

4.1 Public and Private Infrastructure Investment in India

In India, prior to the 1990s, infra services were provided by the government through its budgetary sources. However, an insufficient government funding for the creation

[4]GoI (2015), As on July 23 2015, https://infrastructureindia.gov.in/project-list.

[5]These include construction, operation and pipeline stages of infrastructure projects. Accessed from https://infrastructureindia.gov.in/faqs.

of an adequate infra services base, lack of commitment towards maintenance of the respective existing infrastructure, enormous time and cost overruns of the proposed infra projects and many other aspects have resulted in serious obstacles to the infra growth.

A conducive environment provided by the government through its market-friendly policy initiatives as part of promoting infrastructure PPPs in the country both at the Central and State levels has resulted in a rapid growth of the private sector investment from a mere 20% of the total investment in the tenth plan (2002–07) to 30%[6] in the eleventh plan (2007–12), revealing evidence of a positive response from the private sector and is expected to increase further to 50% of the total infrastructure investment in the twelfth plan (2012–17).

The private capital share in the core infrastructure sectors during the 11th plan[7] was 82% in telecoms, 80% in ports, 64% in airports and 4% in railways. This is expected to increase further during the twelfth plan period.

Infra investment as percent of GDP for the period 2002–2017 is displayed in Chart 3. The chart shows a gradual increase in the infrastructure development in the view of an increased investment by the private sector over the reference period. This was very insignificant prior to the 1990s. Later, with a substantial private sector participation in this sector, the chart shows a steady increase in investment over the period 1999 to 2003–04, and for the subsequent years, a rapid increase in private investment due to the policy initiatives undertaken by the government. Although there has been a discernible growth observed in the rate of infrastructure investment and also development, it becomes evident that infra investment still remains below the expected 9% per annum required for harvesting the full potential of the available resources and achieving a high sustainable GDP growth. To realize this target of 9%[8] (per annum) growth in infrastructure investment, the government needs to streamline its various policy initiatives from time to time in order to lure the unwilling private sector into investing in infrastructure.

The public sector investment has remained stagnant over the entire reference period and is expected to decline from 4.85% of GDP in 2002 to 4.04% by 2016. While with respect to the same reference period, the private sector investment shows a gradual increase from 0.81% of GDP to a peak of 3.73% of GDP, particularly for the financial year 2009. This increasing private sector investment trend is expected to surpass the public sector investment by the end of the 12th plan period. While the sharp increase in the private sector investment is a welcome development, the aggregate realized investment of both the private and public sectors for up to 2011–12 shows how inadequate it has been when it comes to catering to the required infrastructure needs, while the required investment being 9% of GDP.[9] It is only in the event of the Planning Commission's projected figures for the 12th plan being realized that India's infra investment will reach 9% of GDP by 2016–17.

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[6]GOI (2013a) 12th plan, volume 1, p. 87.

[7]GOI (2013b) 12th plan, Vol. 2, p. 212.

[8]GOI (2007) 11th Plan, Planning Commission.

[9]Rakesh (1996) and GOI (2007).

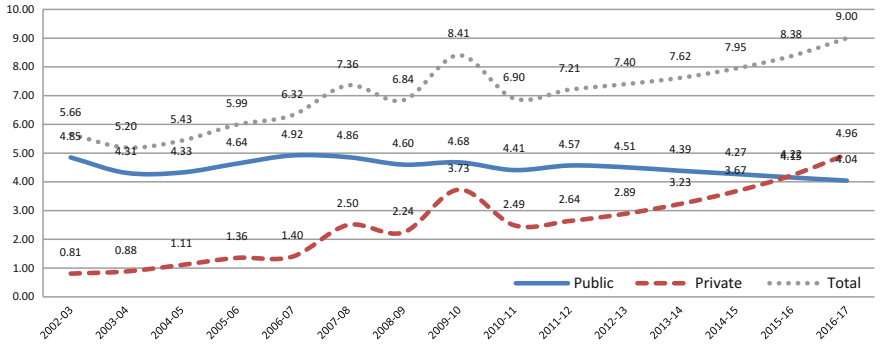

Chart 3 Infra investment as percent of GDP. *Source* Nagesha and Gayithri (2014). *Note* (1) Figures are expressed as percentage of GDP (2) 2002 to 2011–12 figures represent realized investment (3) ** for 2012–17, figures represent the Planning Commission projections

The growth trajectory of PPPs reveals that there has been a sharp increase in the number of PPP projects over the years contributing greatly towards enhancing the regional and sectoral infrastructural availability. However, these projects seem to have been concentrated in certain sectors and regions, both globally and domestically, despite the fact that there exists a sufficient scope for a wider dispersal of PPP projects. The energy sector accounts for the highest number of PPP projects at the international level.

The pattern of growth and distribution of PPP projects in India reveal that the growth of Indian PPPs is more discernible in infrastructure sectors coming under states than in the central infrastructure sectors. Further, the growth pattern of projects reveals that both in the state and central sectors, only a few infrastructure sub-sectors are being developed through PPP mode and that the projects so executed are mainly in the transport sector including roadways, airports, urban infrastructure and seaport sectors with urban infrastructure projects being large. A very few projects in other sub-sectors like health, education and rural infrastructure are also being executed through PPP mode. However, the government's policy as outlined in the 12th FYP vision document of creating social infrastructure through PPPs needs to be adhered to.

The study has also analysed the sectoral and regional concentration of projects in India. The concentration of projects can be seen only in the transport sector. Within the transport sector, national highway projects account for the largest share. Under these projects, only a few PPP models such as BOT toll and annuity methods are mainly used.

The regional concentration of projects has resulted in interstate disparity as far as the spread of PPPs is concerned a few economically developed Indian states account for more than 50% of PPPs. Many states have PPPs undertaken that remain below the national average both in terms of the number of projects and the total investment value. Some states like Himachal Pradesh, Jammu Kashmir, Goa and seven northeastern states, other than Assam, do not have even a single PPP project

undertaken. There exists an intrastate disparity too; i.e., some urban epicentres have cornered a major share of PPPs, leaving rural areas lagging far behind. This regional disparity in the spread of PPPs is widespread across the world. The factors responsible for the sectoral and regional PPP preferences need to be explored in order to evolve suitable policy frameworks for channelizing PPP investments into other sectors and regions that are currently facing a serious deficit in investments. Since, infrastructure is a universal requirement for harnessing the development potential of a nation, there is an urgent need for addressing the infrastructure inadequacies, either through the PPP medium or direct provision by the public sector.

The present study cites the possible reasons for a skewed distribution of projects across the infra sub-sectors and regions in the Indian context: first, differences inherent in the political will on the part of national and sub-national governments with respect to the promotion of infrastructure PPP policies; second, the failure of governments' various infrastructure executive departments including PPP nodal agencies in identifying, executing and coordinating various departments; third, absence of commitment in the promotion of policies for facilitating a hassle-free investment environment; fourth, inordinate delays in the implementation of projects as part of redressing the various differences; fifth, lack of financial assurances to the concessionaires regarding their investments; sixth, lack of availability of land and other incentives like tax concessions and capital grants (viability gap funding); seventh, lack of awareness regarding the nature of project risks and a poor degree of private sector risk management capacity; and eight, inadequate consultations with end users, etc. These are some of the important factors that need to be explored in greater details.

5 Performance of Infra PPPs

GOI's shift from item rate contract to turnkey projects, i.e. a modified EPC or PPP mode of development, has certainly helped address time and cost overruns specific to most of the NH projects. This was one of the major impediments to the government traditionally, due to its limited budgetary sources, as also technological and managerial constraints.

In India, there has been a greater emphasis observed on encouraging competition and regulation with respect to various infrastructure services since the early 1990s. One of the milestone recommendations of the Committee on Infrastructure[10] was to introduce an element of competition and transparency in this sector. The committee recommended that a sufficient room be provided for private investment (both domestic and foreign) in various infrastructure projects as part of increasing accessibility and ensuring enhanced quality in harvesting potential benefits from growth and development. The reform process is oriented towards bringing private domestic and

[10]Rakesh (1996), Government of India (1996).

foreign investment into this sector. In fact, private investment in a few infrastructure sub-sectors like telecommunication, financial institutions, roadways and a few metro airports has resulted in an enhanced competition ex-ante and ex-post in the provision of these services.

5.1 Ex-ante Competition

By ex-ante competition, we mean bringing in an element of competition into the selection process of the private concessionaire through an open competitive bidding for provision of infrastructure services. The degree of competition present in respect of PPP projects can be captured through an analysis of the competitive bidding process, used for awarding infrastructure projects. Demsetz (1968)[11] observes that an ex-ante competition helps provide innovative, low-cost and better quality assured services. A private developer failing to provide such assured services may result in either a penalty/reduced annuity/toll payments or even the elimination of the developer by the respective government authority. Hence, a transparent competitive bidding process in respect of PPPs is the key element in achieving the objective of creating a cost-effective and quality infrastructure base.

The present study has examined the element of competition at the procurement stage of the PPPs by verifying the role of ex-ante competition in determining the aggregate cost of the selected PPP projects with regard to four infra sub-sectors, namely national highways, airports, ports and urban infra of India. In addition, the study also has examined the 'economies of scale' effect of the select national highways (NH)-239 PPP projects (by way of analyzing the concessionaire-wise number of projects handled) on the project cost.

An analysis of 55 Indian NH PPP projects reveals that the level of competition has remained very low, over the entire reference period. As can be seen from Chart 4, the number of single-bidder projects amounts to three that of two- and three-bidder projects 36 (18 each), and so on. A large number of projects account for two and three (number of) bidders. This clearly indicates the presence of duopoly and oligopoly conditions in the participation process of bidders or potential developers in respect of the national highway projects (refer Table 1).

The degree of ex-ante competition across 55 NH PPP projects is not uniform (see Table 1). The study attempted to analyze the association between the level of competition and the cost per lane km of road by employing Spearman rank correlation. In normal circumstances, an increase in competition should be accompanied by a decrease in the TPC and vice versa. However, the correlation results presented in Table 1 reveal a negative correlation between the estimated cost and the number of bidders, irrespective of the number of bidders/developers participating in the bidding process for the 55 projects under review. However, if we ignore the single and two-bidder projects, the results are found significant and robust in that the average cost

[11] Cited from Rathi Vaibhav (2013).

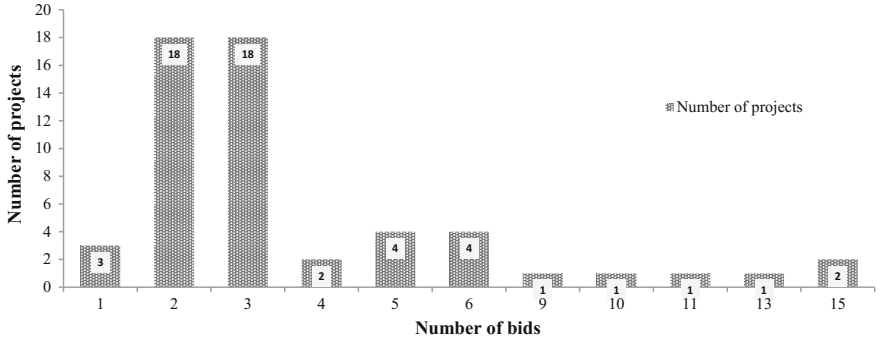

Chart 4 Nature of competition among the select NH PPP projects. *Source* Nagesha (2015)

Table 1 Correlation between competition and cost of NH PPP projects

Number of bidders	Number of projects	Cost per kilo metre (Rs. crore)	Spearman rank correlation	Market type (based on the number of bidders)
1	3	2.25	−0.35	Monopoly
2	18	2.11	−0.15	Duopoly
3	18	4.77[a]	0.35	Oligopoly/monopolistic
4	2	1.23	0.643**	
5	4	1.35	0.46	
6	4	1.52	0.31	
9	1	1.83		
10	1	1.29	1*	
11	1	1.57	1*	
13	1	1.58	1*	
15	2	1.62		
Average	**1.92**			
Minimum	**1.23**			
Maximum	**4.77**			
Median	**1.58**			

Source Author's estimation database on PPPs from Department of Economic Affairs, Ministry of Finance, GoI (2013c)

[a]Cost per kilometre is very high author's compilation under this category due to the presence of BOT annuity projects

*Significant at one percent level, **significant at five percent level

per km is high in respect of single-bidder projects, indicating at a very high monopoly price. Further, the cost decreases in respect of two-bidder projects to Rupees 2.11 crore per km as compared to Rs. 2.25 in respect of single-bidder projects. However, if we consider the projects with more than two bidders together, it becomes clear that the average cost is lowest as against the single and two-bidder projects.

In respect of 18 three-bidder projects under review, the average cost per km works out to Rs. 4.77 crore (refer Table 1) due to the fact that many projects under this category happen to be BOT annuity type projects unlike the other BOT toll projects. The study finds PPP toll projects cheaper than annuity projects.

The study empirically finds that the per unit cost of PPP roads under review is significantly associated with the level of ex-ante competition existing in the market. In addition to ex-ante competition, the study cites many other factors also as responsible in determining the cost of roads which include the type of a given PPP project, i.e. BOT annuity/toll, psychology of bidders and the prevailing political environment, among others. However, it needs to be explored further.

Opting for PPPs might be advantageous to the government as compared to the EPC projects because of their superior managerial and technical expertise and also the fact that they do not involve additional operation and maintenance risk and cost over the lifetime (20–25 years) and also no-interest payment burden on the part of the government. In addition, the performance record of PPP national highway projects for the past fifteen years reveals that the percentage of on-time completion of construction is higher in respect of PPP than EPC projects.

5.2 Value for Money (VfM)

Value for money, in the present context, refers to the financial and non-financial savings to the government and the public/users. It is highly advisable that governments venturing into PPPs make appropriate cost-benefit advantage methodologies available and that they make use of one of the methodological tools, i.e. VfM analysis, as it enables governments to find out whether PPP method of infra service provision can create any positive/additional benefits quantitatively (both financial and non-financial) and qualitatively.

Nagesha and Gayithri (2015) find quantitative VfM to the government positive in respect of the randomly selected three national highway projects to the tune of Rs. 1040 crore; i.e., the government has been able to save money by executing the respective road projects through PPP mode. Further, the authors empirically prove the presence of qualitative VfM in respect of the select national highway projects, based on a road user survey with indicators such as a substantive reduction in travel time, improved fuel efficiency, consistency in reaching the destination and a reduction in vehicle O&M costs, considered construction of better quality roads, followed by a regular operation and maintenance of the same with respect to the average road roughness, guaranteeing of zero potholes, installation of road barricades and all other road furniture and a proper maintenance by the concessionaire, etc., are regularly monitored by an independent consultant in conformation with the PPP contract.

6 Summary

The present study primarily focusses on the theoretical expositions in favour of an alternative to the public provision of infra services through PPPs. Various studies mentioned in the present study prove that PPP mode of infra provision enhances the overall efficiency of services in addition to reducing the fiscal burden governments.

Further, the study highlights the various policy measures undertaken by the government of India towards enhancing the infra base of the country, both at the national and state levels, such as sectoral policies, model concession agreements, exclusive institutional arrangement, etc. These measures have enhanced substantially the infra investment in the country. Presently, India is one of the largest infra PPP countries in the world.

The study, while tracking the growth of PPPs and their relevance, observes a massive increase in the number of infra PPP projects and the volume of investment at the international, national and sub-national levels over time.

Further, the study reveals that there has been a reduction in the cost of provision of infrastructure services, which could be readly attributed to the presence of ex-ante competition. Lastly, the study brings out that value for money to the government and road users is positive.

From the above analysis, one can follow that PPPs have both theoretical and empirical support as an alternative strategy for the provision of infra services vis-a-vis the traditional public budgeting. On the whole, the study results indicate, in brief, that PPP, as an alternative infra provision strategy, could be very effective in addressing issues like efficiency in public budgeting, fiscal consolidation, intergenerational liabilities of public debt and provision of services.

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