The Academic
International Journal of Multidisciplinary Research

An Online Peer Reviewed / Refereed Journal
Volume 3 | Special Issue 1 | September 2025
ISSN: 2583-973X (Online)
Website: www.theacademic.in

PPPs and Foreign Direct Investment: Opportunities for Infrastructure Growth

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DOI : https://doi.org/ 10.5281/zenodo.17306998

ARTICLE DETAILS

Research Paper

Accepted: 20-08-2025

Published: 20-09-2025

Keywords:

PPP, FDI, Infrastructure, Projects, Government.

ABSTRACT

Infrastructure development is a critical prerequisite for sustained economic growth, social inclusion, and global competitiveness. Yet, the financing gap in infrastructure continues to challenge many economies, particularly in developing nations where public resources remain limited. This study examines the role of **Public-Private Partnerships (PPPs)** and **Foreign Direct Investment (FDI)** as strategic instruments to bridge this gap and accelerate infrastructure growth. PPPs enable governments to leverage private sector capital, efficiency, and innovation while ensuring regulatory oversight, whereas FDI contributes long-term capital, advanced technologies, and managerial expertise from international investors. Together, these mechanisms offer opportunities for risk-sharing, efficient project execution, and sustainable infrastructure expansion. The research highlights how the integration of PPP frameworks with foreign investment can enhance project viability, attract global capital, and strengthen institutional capacity. It also addresses key challenges, including policy uncertainties, governance constraints, and the need for transparent regulatory mechanisms. Findings suggest that economies adopting well-structured PPPs, supported by conducive FDI policies,

are more likely to experience accelerated infrastructure development and improved service delivery. This study aims to explore the role of PPPs and FDI in infrastructure growth, assess their opportunities and challenges, and provide insights into how these mechanisms can be leveraged to achieve long-term development objectives

Introduction

Infrastructure is widely recognized as a fundamental driver of economic development, enabling productivity enhancement, trade facilitation, and social welfare. However, many countries, particularly emerging economies, continue to face a persistent gap between infrastructure demand and available public resources. Traditional government financing alone has proven inadequate to meet the rising needs for investment in sectors such as transport, energy, water, and digital infrastructure. This has prompted policymakers and researchers to explore alternative financing mechanisms that can mobilize capital, enhance efficiency, and ensure sustainable infrastructure growth.

In this context, **Public-Private Partnerships (PPPs)** and **Foreign Direct Investment (FDI)** have gained prominence as viable instruments to bridge the infrastructure financing deficit. PPPs provide a framework through which governments can leverage private sector expertise, efficiency, and capital while retaining regulatory oversight. FDI, on the other hand, injects long-term capital, advanced technology, and global best practices into host economies, thereby strengthening the scale and quality of infrastructure development. When combined, PPPs and FDI not only help close the investment gap but also foster innovation, risk-sharing, and sustainable project execution.

According to recent studies, nations that have embraced PPPs backed by foreign investment have seen faster infrastructure growth, increased competitiveness, and better service delivery. However, institutional capacity, investor confidence, risk management systems, and policy frameworks all affect how effective these tools are. Thus, it is crucial for both academic research and policymaking to comprehend how PPPs and FDI might be combined to optimise infrastructure potential.

Public Private Partnership Models

A variety of investment models, including BOT, BOO, DBFO, and LDO, are included in public-private partnership models. These models specify the extent to which the private sector can design, finance, construct, operate, or own public infrastructure and services under predetermined contractual

terms.

1. Build-Operate-Transfer (BOT): Under this framework of public-private partnerships, a private organisation is given the authority to plan, fund, build, and run a facility for a predetermined amount of time.

- The private participant typically uses user fees to recoup its investment at this time. Ownership of the assets is transferred to the government after the allotted period.
- The greatest degree of private sector participation in infrastructure development is seen in this approach.

2. Build-Own-Operate (BOO): Under the BOO structure, a private company assumes ownership, construction, and ongoing facility operations. The asset does not return to public ownership like BOT does.

- To assure viability, the government may provide incentives to the private party, such as tax breaks or policy support.

3. BOT-Annuity Model: Regardless of revenue generated, the private sector manages the project and gets pre-arranged payments from the government on a regular basis under the BOT-Annuity framework.

- The developer's financial risks are decreased because these fixed annuity payments are linked to availability and performance parameters.

4. Operations & Maintenance (O&M)/Service Contracts: O&M or service contracts are brief contracts in which the government assigns private companies to do particular duties, such maintaining or operating public assets.

- These contracts are primarily concerned with service delivery and do not entail investments in the development of infrastructure.

5. Engineering, Procurement, and Construction (EPC): Under this contract type, a private contractor handles all aspect of the project, including design, material procurement, and construction.

- The project is funded by the government and carried out by a private company that does not assume long-term operating responsibility.

6. Hybrid Annuity Model (HAM): This model combines elements of the BOT-Annuity and EPC models. According to this concept, the private developer finances the remaining 60% of the project's construction costs, with the government covering 40%.

- Usually, the developer pays between 20 and 25 percent of the total cost in equity, with the remaining amount paid in debt.
- Annuities are paid by the government over time, which lowers the private player's risk of revenue or traffic.

7. Design-Build-Finance-Operate (DBFO): Usually under a long-term lease, the private partner plans, finances, constructs, and runs the project.

8. Lease-Develop-Operate (LDO): Under this model, an existing facility is leased, upgraded, and run by the private sector for a predetermined amount of time.

Public Private Partnership India

Public-Private Partnerships (PPP) have emerged as a key driver of infrastructure development in India, fostering collaboration between the government and private entities to deliver essential public assets and services.

- **Scale of Implementation**: As of March 2025, India has undertaken more than **1,800 PPP projects** across diverse sectors such as transportation, energy, and urban development, with cumulative investments exceeding **₹24 lakh crore**.
- **Budgetary Support**: The **Union Budget 2025** has placed renewed emphasis on PPPs, particularly in housing, power, and urban infrastructure. Ministries and state governments have been directed to identify **bankable projects** for PPP execution over the next three years.
- **National Infrastructure Pipeline (NIP)**: With an ambitious investment target of **₹111 lakh crore** over five years, the NIP envisions PPPs as a central mechanism for bridging the financing gap in India's infrastructure growth.

Government Initiatives to Strengthen PPPs

To create a supportive ecosystem for PPPs, the Government of India has introduced several policies, funding mechanisms, and institutional frameworks.

1. Viability Gap Funding (VGF)

- Provides financial assistance of up to **40% of total project cost.**
- Ensures implementation of projects that are **economically essential but not commercially viable.**

2. National Monetisation Pipeline (NMP)

- Aims to mobilise **₹6 lakh crore** by monetising core government assets in transportation, energy, telecom, and aviation.
- Covers the period **FY 2021–22 to FY 2024–25**, enhancing resource availability for new infrastructure.

3. India Infrastructure Project Development Fund (IIPDF)

- Supports **early-stage project development**, including feasibility studies, project structuring, and transaction advisory.
- Available for projects initiated by **central, state, and local governments.**

4. Foreign Direct Investment (FDI)

- Allows up to **100% FDI in Special Purpose Vehicles (SPVs)** through the automatic route.
- Encourages stronger **foreign participation and investment flows** in PPP-led infrastructure development.

Public-Private Partnership: Way Forward

To further strengthen Public-Private Partnerships (PPPs) in India, it is crucial to enhance policy clarity, build institutional capacity, ensure equitable risk allocation, engage stakeholders effectively, and establish strong monitoring mechanisms. These measures will foster transparency, efficiency, and sustainable infrastructure development.

1. Policy Reforms

- Streamlining regulations and issuing **clear operational guidelines** can ensure smoother implementation of PPP projects.

2. Capacity Building

- Strengthening **institutional and human resource capacities** for project design, negotiation, and management will improve the overall effectiveness of PPPs.

3. Risk Management

- Developing **standardized frameworks for risk assessment and allocation** can ensure balanced responsibilities between public and private partners, leading to better project outcomes.

4. Stakeholder Engagement

- Actively involving **local communities and stakeholders** during project planning and execution can build public trust and address potential concerns at an early stage.

5. Monitoring and Evaluation

- Establishing **robust monitoring and accountability mechanisms** will help track project performance, ensure transparency, and strengthen trust between stakeholders.

Table- 1: Infrastructure Projects (PPP) - Sector Wise Summary Report

Sr No.	Sector	Number of Projects	Total Project Cost (In Rs. Crore)
1	Airports	74	57767
2	City gas distribution	3	432
3	Cold Chain	12	3459
4	Common infrastructure for industrial parks, SEZ	187	80903
5	Education	37	469
6	Electricity Distribution	16	28757
7	Electricity generation (grid)	371	1630471
8	Electricity transmission	1378	432594
9	Gas pipelines	54	105225
10	Health Care	14	1413
11	Inland waterways	8	5168
12	Irrigation (dams, channels, embankments, etc.)	616	585985

13	Oil pipelines	41	21681
14	Oil/ Gas/ LNG Storage	42	45654
15	Ports (excluding captive)	152	161128
16	Post-harvest storage infrastructure for agriculture and horticulture produce including cold storage	20	650
17	Railway track, tunnel, viaducts, bridges	568	512622
18	Renewable energy (grid)	1606	825530
19	Roads and bridges	2872	958509
20	Sewage collection, treatment and disposal system	274	44675
21	Solid waste management	74	8739
22	Storm water drainage system	69	9241
23	Telecommunication Network and Services	60	875935
24	Telecommunication towers	2	26182
25	Tourism	53	7088
26	Urban public transport (except rolling stock)	116	250382
27	Water supply pipeline	478	125082
28	Water treatment plants	45	7268
	Total	**9,242.00**	**68,13,008.32**

Source: www.pppinindia.gov.in

India has undertaken **9,242 PPP projects** with a cumulative investment of **₹68.13 lakh crore** across diverse infrastructure sectors. **Roads and bridges** lead with **2,872 projects** (₹9.58 lakh crore), followed by **renewable energy** (1,606 projects; ₹8.25 lakh crore) and **electricity generation** (₹16.30 lakh crore). High-cost sectors include **telecommunication networks** (₹8.75 lakh crore) and **railways** (₹5.12 lakh crore). Significant investments also exist in **irrigation**, **urban transport**, and **water supply**. In contrast, **social infrastructure** such as education (₹469 crore) and healthcare (₹1,413 crore) remain underfunded. The data highlights India's PPP focus on transport, energy, and utilities, with limited social sector participation.

FDI opportunities in Indian infrastructure growth

Foreign Direct Investment (FDI) presents significant opportunities for driving infrastructure growth in India, a sector critical to sustaining rapid economic development. With rising urbanization, industrialization, and increasing demand for efficient logistics, transport, and energy systems, India requires massive capital infusion. The **National Infrastructure Pipeline (NIP)** and policies like 100% FDI in infrastructure under the automatic route create a favorable investment climate. FDI can enhance project financing in roads, railways, renewable energy, airports, and urban infrastructure while introducing advanced technologies and global best practices. Public-Private Partnerships (PPPs) supported by mechanisms such as **Viability Gap Funding (VGF)** and the **National Monetisation Pipeline (NMP)** further encourage foreign investors by reducing risks. Additionally, the government's push for smart cities, digital infrastructure, and clean energy expands new avenues for foreign participation. Thus, FDI not only bridges India's infrastructure financing gap but also promotes innovation, efficiency, and sustainable development in the sector.

Table – 2: FDI inflow

FDI Equity Inflow by Route (US$ Million)					
Calendar year (January-December)	Government route	Automatic route	Inflow through acquisition of existing shares route	Various NRI schemes route	RBI's—cumulative total
2000	1,475	394	477	81	2,427
2001	2,142	720	658	51	3,571
2002	1,450	813	1,096	2	3,361
2003	934	509	637	–	2,080
2004	1,055	1,179	980	–	3,214
2005	1,136	1,558	1,661	–	4,355
2006	1,534	7,121	2,465	–	11,120
2007	2,586	8,889	4,447	–	15,922
2008	3,210	23,651	10,234	–	37,095
2009	4,680	19,056	3,309	–	27,045
2010	2,542	14,353	4,111	–	21,006
2011	2,933	19,053	12,636	–	34,622
2012	2,964	15,825	4,000	–	22,789

2013	1,345	12,806	7,887	–	22,038
2014	1,809	20,089	6,887	–	28,785
2015	3,390	31,511	3,232	–	38,133
2016	6,461	32,833	7,108	–	46,402
2017	6,627	28,614	8,335	–	43,576
2018	3,341	34,726	4,341	–	42,408
2019	3,423	36,956	7,264	–	47,643
2020	559	56,541	7,578	–	64,678
2021	2,202	36,605	12,532	–	51,339
2022	776	41,934	9,635	–	52,345
2023	366	28,515	12,443	–	41,326
2024	2,107	38,126	12,826	–	53,059
Grand total (as on December 31, 2024)	61,045	5,12,377	1,46,780	589	7,20,336

*Source: **DPIIT, FDI newsletter, Volume 33, January 2025**.*

From 2000 to 2024, India recorded cumulative **FDI equity inflows of US$ 720.3 billion**. The **automatic route** dominated, contributing **US$ 512.4 billion (71%)**, followed by **inflows through acquisition of existing shares** at **US$ 146.8 billion (20%)**. The **government route** accounted for **US$ 61 billion (8%)**, while **NRI schemes** added only **US$ 589 million**. Inflows surged significantly after 2006, peaking in **2020 (US$ 64.7 billion)** due to strong automatic route inflows. However, post-2020, inflows fluctuated, with **2024 recording US$ 53.1 billion**. Overall, FDI trends highlight India's liberalized regime, with the automatic route remaining the primary channel.

FDI Role in PPPs for Growth of Infrastructure in India

Infrastructure development is one of the fundamental drivers of economic growth, and in a developing country like India, the demand for modern infrastructure has been rapidly increasing. However, the financial requirements to build roads, ports, airports, power plants, and urban facilities are enormous, often surpassing the capacity of the government and domestic private sector alone. To address this gap, India has adopted the **Public–Private Partnership (PPP)** model as a mechanism for collaboration between the state and private players. Within this framework, **Foreign Direct Investment**

(FDI) plays a crucial role by supplying capital, technology, and global expertise that accelerate the growth of infrastructure.

Capital Infusion and Bridging Investment Gaps

Infrastructure projects are highly capital-intensive and require long gestation periods, which makes them less attractive to domestic investors who often seek quicker returns. FDI provides a steady flow of long-term capital that reduces pressure on public finances and complements domestic investment. In PPP projects, foreign investors share the financial burden with the government and Indian firms, ensuring that critical projects such as highways, airports, and metro systems are executed without excessive delays due to funding shortages.

Risk Sharing and Project Viability

One of the core strengths of PPPs lies in their ability to distribute risks among stakeholders. FDI enhances this mechanism by enabling global investors to take on a share of financial and operational risks. For instance, in Build–Operate–Transfer (BOT) models, foreign partners often manage operational aspects, while the government provides policy and regulatory support. Additionally, schemes like **Viability Gap Funding (VGF)** make PPP projects more attractive to foreign investors, ensuring project sustainability.

Technology Transfer and Efficiency

FDI-backed PPPs bring in advanced technologies, innovative construction methods, and modern management practices from developed economies. This leads to improved efficiency, better quality of infrastructure, and reduced project delays. For example, the involvement of foreign companies in India's airport modernization projects introduced world-class passenger facilities, digital systems, and safety standards. Similarly, in renewable energy PPPs, foreign firms have introduced cutting-edge solar and wind technologies that support India's clean energy transition.

Employment Generation and Skill Development

The inflow of FDI in PPP projects not only creates direct employment in construction and operations but also generates indirect opportunities in allied sectors such as cement, steel, logistics, and services. Moreover, foreign partners contribute to the transfer of managerial and technical skills, enhancing the capabilities of the Indian workforce and raising industry standards.

Examples in Indian Infrastructure

Several successful PPP projects highlight the contribution of FDI. The development of **Delhi and Mumbai international airports** under PPPs with foreign participation has transformed passenger experience and improved global connectivity. Ports such as Mundra and Pipavav, with international partnerships, have become critical nodes in India's trade. Similarly, foreign investment in **national highways, metro projects, and renewable energy parks** has accelerated infrastructure growth in urban and rural areas.

Government Support and Future Prospects

The Indian government has taken significant steps to attract FDI in PPPs, such as allowing **100% FDI under the automatic route** in most infrastructure sectors, launching the **National Infrastructure Pipeline (NIP),** and implementing **PM Gati Shakti** for integrated planning. These initiatives, along with asset monetization and digital platforms, provide ample opportunities for foreign investors to collaborate through PPPs.

Conclusion

Public-Private Partnerships (PPPs) and Foreign Direct Investment (FDI) together play a transformative role in addressing India's infrastructure financing and development challenges. PPPs enable governments to leverage private sector capital, efficiency, and innovation, while FDI provides long-term financial resources, advanced technology, and global expertise. The integration of these mechanisms strengthens project viability, enhances risk-sharing, and accelerates the execution of large-scale infrastructure projects. Evidence from sectors such as roads, airports, ports, and renewable energy highlights the significant contribution of foreign participation in modernizing infrastructure and improving service delivery. However, the effectiveness of PPPs and FDI depends on transparent regulatory frameworks, institutional capacity, and effective risk management. With continued policy support, including initiatives like the National Infrastructure Pipeline (NIP), Viability Gap Funding (VGF), and 100% FDI allowances, India is well-positioned to attract global investment. Strengthening PPPs through FDI will be essential for ensuring sustainable, inclusive, and globally competitive infrastructure growth.

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