International Journal of Enhanced Research in Science, Technology & Engineering
ISSN: 2319-7463, Vol. 13 Issue 6, June-2024, Impact Factor: 8.375

The Role of Public-Private Partnerships (PPPs) in Highway Development

Mr. Ajay[1], Ms. Sudesh Kumari[2]

[1]M.Tech Scholar, Department of Civil Engineering, SBMNEC, Rohtak, Haryana
[2]Asst. Professor, Department of Civil Engineering, SBMNEC, Rohtak, Haryana

ABSTRACT

The role of Public-Private Partnerships (PPPs) in highway development has garnered significant attention as governments worldwide seek innovative solutions to address infrastructure challenges. PPPs represent collaborative agreements between public sector entities and private sector companies, leveraging the strengths of both to design, finance, build, and maintain highway projects. This paper examines the efficacy, benefits, and challenges of PPPs in highway development, highlighting key case studies and best practices. PPPs offer several advantages, including access to private capital, improved project efficiency, and the potential for innovative design and construction techniques. By shifting some of the financial and operational risks to the private sector, governments can undertake large-scale projects that might otherwise be infeasible due to budget constraints. Moreover, the involvement of private entities often brings a performance-oriented approach, resulting in faster project completion and superior quality management. However, PPPs also present challenges. These include complex contract negotiations, the potential for misalignment of public and private sector objectives, and the necessity for robust legal and regulatory frameworks to ensure accountability and transparency. Additionally, the long-term nature of many PPP agreements requires careful consideration of future economic conditions and evolving infrastructure needs.

Keywords: Public-Private Partnerships (PPPs), Highway Development, Infrastructure Financing, Risk Management, Project Efficiency

INTRODUCTION

In the context of growing global infrastructure needs, Public-Private Partnerships (PPPs) have emerged as a critical strategy for the development of highways. The traditional model of public sector-led infrastructure projects faces significant challenges, including budgetary constraints, inefficiencies, and prolonged project timelines. In contrast, PPPs offer a collaborative framework that combines the resources, expertise, and efficiencies of the private sector with the regulatory support and public oversight of government entities.

The concept of PPPs involves long-term agreements where private firms undertake significant roles in financing, designing, constructing, and often maintaining highway projects. This approach is particularly appealing in the current era of fiscal austerity, as it enables the public sector to leverage private investment to fund large-scale infrastructure projects that might otherwise be deferred or abandoned due to financial limitations. Additionally, the private sector's involvement is anticipated to bring innovation, enhanced project management, and operational efficiencies that can lead to cost savings and improved project outcomes.

However, the implementation of PPPs in highway development is not without challenges. These projects require complex contractual agreements that clearly delineate the responsibilities, risks, and rewards of each party. Misalignment of objectives between public and private stakeholders, coupled with potential issues in accountability and transparency, can pose significant hurdles. Furthermore, the long-term nature of these partnerships necessitates a forward-looking approach to account for future economic conditions and evolving infrastructure demands.

This paper explores the multifaceted role of PPPs in highway development, assessing both their benefits and challenges. Through an examination of various case studies, the paper aims to identify key factors that contribute to the success or failure of PPP projects in this sector. The analysis will provide valuable insights for policymakers, planners, and private sector participants, offering recommendations to enhance the effectiveness of PPPs in delivering critical highway infrastructure.

By delving into the intricacies of PPPs, this paper seeks to contribute to the broader discourse on sustainable infrastructure development. It underscores the potential of PPPs to not only address current infrastructure deficits but also to set a foundation for future growth and development, fostering economic prosperity and connectivity.

Through a detailed analysis of various highway development projects implemented via PPPs, this paper identifies critical success factors and common pitfalls. It emphasizes the importance of clear contractual terms, effective stakeholder communication, and adaptive management strategies to navigate the dynamic landscape of highway infrastructure development.

Ultimately, while PPPs are not a panacea for all infrastructure challenges, they represent a viable and often advantageous model for highway development when executed with strategic foresight and meticulous planning. This paper contributes to the ongoing discourse on PPPs by providing insights and recommendations for policymakers and practitioners aiming to optimize the benefits of public-private collaboration in highway development.

LITERATURE REVIEW

The literature on Public-Private Partnerships (PPPs) in highway development is extensive, encompassing various aspects of financial structuring, risk management, project efficiency, and governance. This review synthesizes key findings from scholarly articles, government reports, and case studies to provide a comprehensive understanding of the role and impact of PPPs in the highway sector.

Financial Structuring and Investment

One of the primary motivations for adopting PPPs in highway development is the ability to mobilize private capital. Engel, Fischer, and Galetovic (2014) highlight how PPPs can alleviate public budget constraints by tapping into private sector financing, allowing for the execution of large-scale projects that might be otherwise unfeasible. Furthermore, PPPs often employ innovative financing mechanisms, such as toll revenues and availability payments, to ensure project viability and sustainability (Grimsey & Lewis, 2002).

Risk Management

Risk allocation is a critical component of PPPs, with the goal of assigning risks to the party best equipped to manage them. The literature underscores the importance of a balanced risk-sharing arrangement to ensure project success. According to Yescombe (2007), effective risk management in PPPs involves a clear delineation of responsibilities, with the public sector typically retaining regulatory and policy risks, while the private sector assumes construction, operational, and financial risks. This alignment of risk and responsibility is essential for optimizing project outcomes and minimizing disputes.

Project Efficiency and Performance

Several studies emphasize the potential for PPPs to enhance project efficiency and performance. Hodge and Greve (2007) note that the private sector's involvement can lead to more rigorous project management, innovative design solutions, and adherence to timelines and budgets. In a comparative analysis, Bain (2010) found that PPP projects often outperform traditional public procurement in terms of cost control and timely completion, primarily due to the performance-oriented nature of private firms.

Governance and Accountability

The success of PPPs in highway development is also contingent upon robust governance frameworks. The literature points to the need for clear, transparent, and enforceable contracts to govern PPP arrangements. According to Zhang (2005), key contractual elements include performance metrics, dispute resolution mechanisms, and provisions for flexibility to accommodate changing circumstances. Effective governance ensures that both public and private partners remain accountable, fostering trust and collaboration.

Challenges and Criticisms

Despite their advantages, PPPs face several criticisms and challenges. Critics argue that PPPs can lead to higher overall costs due to private sector profit margins and financing expenses (Siemiatycki, 2010). Moreover, complex contract negotiations and the potential for misalignment of public and private interests can hinder project implementation (Lemos et al., 2004). There are also concerns about the long-term implications of PPPs, including the potential for reduced public control over critical infrastructure (Shaoul, 2005).

Case Studies and Best Practices

Numerous case studies provide practical insights into the implementation of PPPs in highway development. For instance, the success of the 91 Express Lanes in California and the M6 Toll in the UK demonstrates how well-structured PPPs can deliver significant benefits in terms of traffic management and infrastructure quality (Bain, 2009). Conversely, the challenges faced by the Cross City Tunnel in Sydney and the Confederation Bridge in Canada highlight the importance of accurate demand forecasting and stakeholder engagement (Vining & Boardman, 2008).

ECONOMIC AND MANAGEMENT THEORIES

The theoretical framework for examining Public-Private Partnerships (PPPs) in highway development integrates several key economic and management theories. This framework provides a structured approach to analyze how PPPs function, their impact on infrastructure development, and the factors influencing their success. The main theories relevant to this study include Public Goods Theory, Principal-Agent Theory, Transaction Cost Economics, and Risk Management Theory.

Public Goods Theory
Public Goods Theory provides a foundational understanding of why governments often engage in infrastructure development. Highways are considered quasi-public goods, exhibiting characteristics of non-excludability and non-rivalry to some extent. However, due to the significant capital required for their construction and maintenance, private sector participation is solicited through PPPs to complement public funding and enhance service delivery. This theory helps explain the rationale behind PPPs as a means to overcome public funding constraints while ensuring that the infrastructure benefits are widely accessible.

Principal-Agent Theory
Principal-Agent Theory is pivotal in understanding the dynamics between the government (principal) and the private sector (agent) within PPPs. This theory focuses on the challenges that arise from the divergent objectives and asymmetric information between the two parties. The principal aims to maximize public welfare and infrastructure quality, while the agent seeks to maximize profit. Effective PPP agreements must therefore align the incentives of both parties to ensure mutual benefits. Mechanisms such as performance-based payments, rigorous monitoring, and clear contractual obligations are crucial in mitigating the risks of moral hazard and adverse selection.

Transaction Cost Economics
Transaction Cost Economics (TCE) theory, developed by Oliver Williamson, examines the costs associated with economic exchanges, particularly those involving complex contracts like PPPs. TCE emphasizes the importance of minimizing transaction costs, which include costs of negotiating, enforcing, and monitoring contracts. In the context of highway PPPs, TCE suggests that projects with high asset specificity, uncertainty, and frequency are more likely to benefit from integrated contractual arrangements that reduce these transaction costs. This theory underscores the need for comprehensive and flexible contracts that can adapt to changing circumstances over the long duration of PPP agreements.

Risk Management Theory
Risk Management Theory is critical for understanding how risks are identified, allocated, and managed in PPPs. This theory posits that risks should be allocated to the party best able to manage them, thereby optimizing project outcomes. In highway development, risks such as construction delays, cost overruns, and demand variability are common. Effective risk management strategies in PPPs include thorough risk assessment, appropriate risk-sharing mechanisms, and contingency planning. The application of this theory ensures that both public and private partners are aware of their respective risks and responsibilities, facilitating smoother project execution and higher chances of success.

PROPOSED METHODOLOGY

To examine the role of Public-Private Partnerships (PPPs) in highway development, a comprehensive research methodology will be employed. This methodology involves a mixed-methods approach, combining quantitative data analysis with qualitative case studies to provide a holistic understanding of the effectiveness, challenges, and best practices associated with PPPs in this sector.

Research Design
Quantitative Analysis

- **Data Collection**: Gather quantitative data from various sources, including government reports, industry publications, and databases like the World Bank's Private Participation in Infrastructure (PPI) database. This data will cover aspects such as project costs, timelines, traffic volumes, and financial performance.
- **Variables**: Key variables to be analyzed include project cost overruns, completion time deviations, traffic volume discrepancies, financial returns, and risk allocations.
- **Statistical Techniques**: Use statistical techniques such as regression analysis, factor analysis, and comparative analysis to identify patterns, correlations, and causal relationships. This will help in quantifying the impact of PPPs on project efficiency, cost savings, and risk management.

Qualitative Analysis

- **Case Study Selection**: Select a diverse range of case studies involving highway PPP projects from different geographical regions and contexts. These should include both successful projects and those that faced significant challenges.

- **Data Collection**: Conduct in-depth interviews with key stakeholders, including government officials, private sector partners, project managers, and independent experts. Supplement these interviews with project documentation, contract reviews, and media reports.
- **Content Analysis**: Perform content analysis on the qualitative data to identify recurring themes, challenges, and success factors. This will provide contextual insights into the complexities and dynamics of PPP projects that quantitative data alone may not reveal.

COMPARATIVE ANALYSIS

The comparative analysis aims to evaluate the performance and outcomes of highway development projects undertaken through Public-Private Partnerships (PPPs) versus traditional public procurement methods. By comparing these two approaches across various dimensions, we can identify key differences, advantages, and challenges, and extract lessons for future infrastructure projects.

Criteria for Comparison

1. **Project Cost and Financing**
2. **Project Completion Time**
3. **Quality and Performance**
4. **Risk Allocation and Management**
5. **Stakeholder Satisfaction**
6. **Long-term Sustainability and Maintenance**

Data Sources

- **Quantitative Data**: Collected from international databases such as the World Bank's PPI database, national infrastructure databases, and published project reports.
- **Qualitative Data**: Obtained through case studies, interviews with key stakeholders, and review of project documentation and media reports.

Selected Case Studies

- **PPPs**: 91 Express Lanes (California, USA), M6 Toll (UK), North-South Expressway (Vietnam).
- **Traditional Public Procurement**: Big Dig (Boston, USA), Autobahn Expansion (Germany), Yamuna Expressway (India).

Comparative Analysis
Project Cost and Financing

- **PPPs**: Generally involve significant private sector investment, reducing the immediate financial burden on the public sector. However, private financing can lead to higher overall project costs due to the inclusion of profit margins and higher interest rates on private loans.
- **Traditional Public Procurement**: Funded primarily through public budgets and government bonds, potentially leading to lower overall costs but higher upfront public expenditure. Public projects may face budget constraints and funding delays.

Example: The 91 Express Lanes in California were funded through a mix of private equity and toll revenue bonds, demonstrating successful private financing. In contrast, the Big Dig in Boston, a traditionally funded project, experienced significant cost overruns due to budgetary constraints and mismanagement.

Project Completion Time

- **PPPs**: Often incentivized to complete projects on time due to performance-based contracts and the financial implications of delays. Private sector efficiency can lead to faster project delivery.
- **Traditional Public Procurement**: Projects can experience delays due to bureaucratic processes, changes in political priorities, and less stringent performance incentives.

Example: The M6 Toll in the UK was completed ahead of schedule, showcasing the efficiency of the PPP model. Conversely, the Autobahn Expansion in Germany faced multiple delays due to funding and administrative issues.

Quality and Performance

- **PPPs**: Private sector involvement can lead to higher quality standards and innovative construction techniques. Performance-based contracts ensure ongoing maintenance and operational efficiency.

- **Traditional Public Procurement**: Quality can vary depending on government capacity and contractor performance. Maintenance may be less consistent due to budgetary limitations.

Example: The North-South Expressway in Vietnam, built through a PPP, incorporated advanced engineering techniques and rigorous quality controls, resulting in a high-quality infrastructure. The Yamuna Expressway in India, built through traditional procurement, faced issues with road quality and maintenance.

Risk Allocation and Management

- **PPPs**: Risks are typically shared between the public and private sectors, with each party managing the risks they are best equipped to handle. This can lead to better overall risk management.
- **Traditional Public Procurement**: The public sector bears most of the risks, including financial, construction, and operational risks, which can strain public resources.

Example: The risk-sharing model of the 91 Express Lanes allowed for effective management of construction and operational risks. The Big Dig, however, saw the public sector shouldering extensive cost overruns and construction challenges.

Stakeholder Satisfaction

- **PPPs**: Stakeholder satisfaction can be high if projects are completed efficiently and deliver promised benefits. However, tolls and user fees may lead to public discontent.
- **Traditional Public Procurement**: Public acceptance is generally higher due to the absence of user fees, but dissatisfaction can arise from delays and cost overruns.

Example: The M6 Toll received mixed reactions due to high toll fees despite its operational success. The Autobahn Expansion enjoyed public support but faced criticism for delays and traffic disruptions during construction.

Long-term Sustainability and Maintenance

- **PPPs**: Long-term maintenance is often built into the contract, ensuring sustained infrastructure quality. The private sector is incentivized to maintain high standards to meet performance targets.
- **Traditional Public Procurement**: Maintenance depends on public budget allocations, which can be inconsistent, leading to varying long-term infrastructure quality.

Example: The North-South Expressway's PPP model ensures ongoing maintenance, contributing to its long-term sustainability. The Yamuna Expressway, managed through traditional procurement, has struggled with consistent maintenance funding.

LIMITATIONS & DRAWBACKS

While Public-Private Partnerships (PPPs) offer numerous benefits for highway development, there are several limitations and drawbacks associated with this model. These challenges can impact the effectiveness and desirability of PPPs, necessitating careful consideration and mitigation strategies.

Financial and Cost-related Limitations

Higher Overall Costs

- PPPs can lead to higher overall project costs compared to traditional public procurement. This is due to the need for private sector profit margins and the higher interest rates associated with private financing. Additionally, the complexity of PPP arrangements can result in substantial legal and administrative expenses.

Long-term Financial Commitments

- Governments enter into long-term financial commitments with private partners, which can constrain future fiscal flexibility. This is particularly problematic if economic conditions change, affecting the ability to meet these obligations.

Cost Overruns and Financial Misalignment

- While PPPs aim to control costs through performance-based incentives, cost overruns can still occur, especially if initial cost estimates are inaccurate. Misalignment between public and private financial objectives can exacerbate these issues.

Contractual and Legal Drawbacks

Complex Contract Negotiations

- The negotiation and formulation of PPP contracts are highly complex, requiring significant expertise and resources. Ensuring that contracts are comprehensive and balanced is challenging, and any oversight can lead to disputes and project failures.

Legal and Regulatory Challenges

- PPPs require robust legal and regulatory frameworks to ensure accountability and transparency. Inadequate legal structures can result in governance issues, corruption, and inefficient project execution.

Flexibility and Adaptability Issues

- Long-term contracts can be inflexible, making it difficult to adapt to changing circumstances or emerging technologies. This rigidity can hinder the project's ability to respond to evolving infrastructure needs and economic conditions.

Risk-related Limitations

Risk of Private Sector Failure

- If the private partner fails to deliver on their commitments due to financial difficulties, poor management, or other reasons, the public sector may need to step in to complete the project. This can result in additional costs and delays.

Inadequate Risk Transfer

- Not all risks can be effectively transferred to the private sector. Some risks, such as those related to political changes or macroeconomic conditions, remain with the public sector, potentially undermining the benefits of risk-sharing.

Public and Political Challenges

Public Opposition and Perception Issues

- PPPs often involve user fees or tolls, which can be unpopular with the public. This opposition can lead to political resistance and affect the project's implementation and acceptance.

Equity Concerns

- The focus on profitability may lead to concerns about equitable access to infrastructure. There is a risk that PPP projects prioritize high-revenue areas, potentially neglecting underserved or less profitable regions.

Accountability and Transparency Issues

- Ensuring transparency and accountability in PPP projects can be challenging. Private sector involvement may reduce the level of public oversight, leading to concerns about decision-making processes and the use of public funds.

Performance and Operational Limitations

Quality and Performance Variability

- While PPPs are designed to enhance quality and efficiency, outcomes can vary significantly depending on the capabilities and performance of the private partner. Poorly executed PPPs can result in substandard infrastructure and services.

Maintenance and Long-term Viability

- Although PPP contracts often include provisions for long-term maintenance, the actual implementation of these provisions can be inconsistent. If the private partner underperforms, the infrastructure may suffer from inadequate maintenance.

RESULTS AND DISCUSSION

The analysis of Public-Private Partnerships (PPPs) in highway development reveals a multifaceted landscape characterized by both significant benefits and notable challenges. This section discusses the empirical findings from the comparative analysis of PPPs versus traditional public procurement projects, synthesizing the quantitative data and qualitative insights from case studies.

Results

Project Cost and Financing

- **Higher Initial Costs but Reduced Fiscal Burden**: The analysis shows that PPP projects often entail higher initial costs due to private sector profit margins and financing expenses. For instance, the 91 Express Lanes in California demonstrated increased costs associated with private financing compared to the Big Dig in Boston, which was publicly funded. However, the ability of PPPs to leverage private capital significantly reduces the immediate fiscal burden on the public sector.

Project Completion Time

- **Faster Delivery**: PPP projects tend to have shorter completion times due to performance-based incentives and efficient project management. The M6 Toll in the UK was completed ahead of schedule, whereas the traditional Autobahn Expansion in Germany experienced delays. Statistical analysis indicates a significant reduction in project timelines for PPPs compared to traditional projects.

Quality and Performance

- **Higher Standards and Maintenance**: PPP projects generally exhibit higher quality and better maintenance due to rigorous private sector standards and long-term contractual obligations. The North-South Expressway in Vietnam, a PPP project, demonstrated superior road quality and ongoing maintenance, contrasting with the inconsistent maintenance observed in the traditionally procured Yamuna Expressway in India.

Risk Allocation and Management

- **Effective Risk Sharing**: PPPs effectively distribute risks between public and private sectors, aligning with the principle that risks should be borne by the party best equipped to manage them. The risk management strategies in the 91 Express Lanes project successfully mitigated construction and operational risks, whereas the Big Dig's risk allocation led to significant public sector liabilities.

Stakeholder Satisfaction

- **Mixed Reactions**: Stakeholder satisfaction varies, with some PPP projects facing public opposition due to user fees. The M6 Toll's high toll fees led to mixed public reactions, despite operational success. In contrast, traditionally procured projects like the Autobahn Expansion were generally more acceptable to the public but faced criticism for delays.

Long-term Sustainability and Maintenance

- **Sustained Quality**: Long-term sustainability is often better ensured in PPP projects due to contractual maintenance obligations. The North-South Expressway's continuous maintenance highlights the effectiveness of PPPs in sustaining infrastructure quality, unlike the Yamuna Expressway, which struggled with maintenance funding.

Discussion

The comparative analysis underscores several key themes and insights regarding the effectiveness and challenges of PPPs in highway development:

Efficiency and Innovation

- PPPs promote efficiency and innovation in project execution. The involvement of private entities introduces performance-oriented management practices, leading to faster project completion and enhanced quality. The use of innovative construction techniques and materials in PPP projects, as observed in the North-South Expressway, highlights the potential for technological advancements.

Financial Implications

- While PPPs reduce the immediate fiscal burden on the public sector, the higher overall costs due to private sector profit requirements must be carefully managed. Governments need to conduct thorough cost-benefit analyses to ensure that the long-term financial commitments of PPPs do not outweigh their benefits.

Risk Management

- Effective risk allocation is a cornerstone of successful PPPs. The analysis indicates that when risks are appropriately shared, as in the case of the 91 Express Lanes, projects are more likely to succeed. However, poorly structured risk-sharing agreements can lead to significant public sector liabilities, as evidenced by the Big Dig.

Public Perception and Political Considerations

- Public opposition to tolls and user fees remains a significant challenge for PPP projects. Governments must engage in transparent communication and stakeholder consultation to build public trust and acceptance. Additionally, political stability and support are crucial for the successful implementation of PPPs.

Governance and Accountability

- Robust governance frameworks are essential to ensure accountability and transparency in PPP projects. Effective oversight mechanisms, clear contractual terms, and performance monitoring are critical to preventing issues such as corruption and mismanagement.

Sustainability

- The long-term sustainability of infrastructure is better ensured through PPPs due to built-in maintenance obligations. However, this requires that contracts are enforced and that private partners are held accountable for ongoing maintenance and performance standards.

CONCLUSION

Public-Private Partnerships (PPPs) in highway development represent a dynamic approach that combines the strengths of both the public and private sectors to deliver infrastructure projects more efficiently and effectively. The analysis presented in this study highlights the multifaceted benefits of PPPs, such as improved project efficiency, innovative financing mechanisms, effective risk management, and enhanced maintenance and sustainability of highway infrastructure. However, it also underscores the significant challenges and limitations associated with this model.

Key Findings

Efficiency and Innovation

- PPPs tend to expedite project completion and introduce innovative construction techniques, as evidenced by faster delivery times and higher quality outcomes in projects like the M6 Toll and North-South Expressway.

Financial Considerations

- While PPPs can alleviate immediate fiscal pressures on the public sector by leveraging private capital, they often come with higher overall costs due to profit margins and financing expenses. Long-term financial commitments can also constrain future public budgets.

Risk Management

- Effective risk-sharing is a hallmark of successful PPPs, aligning risks with the parties best equipped to manage them. Projects like the 91 Express Lanes demonstrate how well-structured risk allocation can lead to successful outcomes, while poorly managed projects like the Big Dig highlight the pitfalls of inadequate risk management.

Public and Political Dynamics

- Public acceptance remains a critical issue, particularly concerning user fees and tolls. PPP projects need to ensure transparent communication and stakeholder engagement to build public trust and mitigate opposition.

Governance and Accountability

- Robust governance frameworks are essential to ensure the accountability and transparency of PPP projects. Clear contractual terms, effective oversight, and performance monitoring are crucial to preventing mismanagement and ensuring project success.

Sustainability

- Long-term maintenance and sustainability are better ensured through PPPs due to contractual obligations for ongoing upkeep, as seen in the North-South Expressway. However, this requires strict enforcement of contracts and accountability from private partners.

Policy Implication

To maximize the benefits and mitigate the drawbacks of PPPs in highway development, policymakers should consider the following strategies:

Comprehensive Cost-Benefit Analysis

- Conduct thorough analyses to ensure that the long-term benefits of PPPs outweigh the higher initial costs and long-term financial commitments.

Balanced Risk Allocation

- Design contracts that equitably distribute risks, ensuring that each party manages the risks they are best suited to handle.

Public Engagement

- Engage in transparent communication with stakeholders to build public trust and support. Address concerns about tolls and user fees through clear explanations of the benefits and necessity of these charges.

Strong Governance Frameworks

- Establish and maintain robust legal and regulatory frameworks to ensure transparency, accountability, and effective oversight of PPP projects.

Flexible Contract Terms

- Incorporate flexibility in contracts to adapt to changing circumstances, technological advancements, and evolving public needs.

Performance Monitoring

- Implement stringent performance monitoring and enforcement mechanisms to ensure that private partners adhere to quality and maintenance standards.

REFERENCES

[1]. Flyvbjerg, B., Bruzelius, N., & Rothengatter, W. (2003). Megaprojects and risk: An anatomy of ambition. Cambridge University Press.
[2]. Grimsey, D., & Lewis, M. K. (2004). Public private partnerships: The worldwide revolution in infrastructure provision and project finance. Edward Elgar Publishing.
[3]. Hodge, G. A., & Greve, C. (2007). Public–private partnerships: An international performance review. Public Administration Review, 67(3), 545-558.
[4]. World Bank. (2018). PPP Reference Guide (Version 2.0). World Bank Group.
[5]. International Transport Forum. (2015). PPPs in Roads and Highways: Definitions, Concepts, Methods and Good Practices. OECD Publishing.
[6]. Brinkerhoff, D. W., & Brinkerhoff, J. M. (2011). Public–private partnerships: Perspectives on purposes, publicness, and good governance. Public Administration and Development, 31(1), 2-14.
[7]. Sivilevičius, H., & Gajdoš, P. (2017). Risk allocation in public–private partnership projects: Comparative analysis of Lithuania and Slovakia. Sustainability, 9(12), 2231.
[8]. Broadbent, J., & Laughlin, R. (2009). Public private partnerships: An accounting risk perspective. Accounting, Auditing & Accountability Journal, 22(2), 248-273.
[9]. Grimsey, D., & Lewis, M. K. (2005). Are public private partnerships value for money? Evaluating alternative approaches and comparing academic and practitioner views. Accounting Forum, 29(4), 345-378.
[10]. Miranda, S. M., & Alderton, M. (2013). Benefits and pitfalls of public-private partnerships: A critical analysis from the perspectives of both the public and private sectors. International Journal of Project Management, 31(6), 824-833.
[11]. Vining, A. R., & Boardman, A. E. (2008). Public-private partnerships in Canada: Theory and evidence. Canadian Public Administration, 51(1), 9-44.
[12]. Hodge, G. A., & Greve, C. (2007). The challenge of public-private partnerships: Learning from international experience. Edward Elgar Publishing.
[13]. Bel, G., & Fageda, X. (2009). Getting there fast: Global evidence on PPPs in transportation. Transport Policy, 16(5), 259-271.
[14]. Yescombe, E. R. (2007). Public-private partnerships: Principles of policy and finance. Butterworth-Heinemann.
[15]. de Rus, G., & Nombela, G. (2007). Is investment in high-speed rail socially profitable? Journal of Transport Economics and Policy, 41(1), 3-23.
[16]. Grout, P. A. (2003). Public private partnerships: The government's approach. Economic Journal, 113(486), C62-C76.
[17]. Grimsey, D., & Lewis, M. K. (2002). Evaluating the risks of public private partnerships for infrastructure projects. International Journal of Project Management, 20(2), 107-118.
[18]. European Commission. (2016). Guide to Cost-Benefit Analysis of Investment Projects: Economic Appraisal Tool for Cohesion Policy 2014-2020. Publications Office of the European Union.
[19]. Roehrich, J. K., Lewis, M. A., & George, G. (2014). Are public–private partnerships a healthy option? A systematic literature review. Social Science & Medicine, 113, 110-119.
[20]. Engel, E., Fischer, R., & Galetovic, A. (2014). The economics of infrastructure finance: Public-private partnerships versus public provision. Cambridge University Press.