

**Partnerships and Risk Allocation Strategies in Managing Sustainable Infrastructure
Development in Saudi Arabia**

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Introduction

Public-private partnerships have become increasingly common due to the rising demand for new infrastructure as well as the rehabilitation of aging infrastructure. At the same time, public resources have become increasingly limited, thus making Public-Private Partnerships (PPPs) popular. In Saudi Arabia, Public-Private Partnerships have become increasingly common in many sectors for several reasons. Saudi Arabia aims to have modern and sustainable infrastructure in line with the country's Vision 2030 goals. It also aims to become a modern nation with a diverse economy whereby the local population learns new and diverse skills essential for maintaining a modern economy (Saudi Vision 2030, 2024). Public-Private Partnerships facilitate this process through the transfer of technology to public-sector workers. With a growing population, Saudi Arabia has to build new and sustainable infrastructure to accommodate the growing population. Thus, PPPs are crucial to the country's plans to meet highly ambitious goals. This research essay explores the links between PPPs and risk allocation strategies that exist in Saudi Arabia's sustainable infrastructure development plans and their implementation.

Research Problem

PPPs come with several benefits, especially when it comes to infrastructure development. However, there are also several challenges when it comes to the area of risk allocation. The traditional practices used to allocate risk are largely obsolete as they do not factor in sustainability, and thus, using them can hinder a project from achieving most of its environmental, social, and economic sustainability goals. New and emerging concerns are becoming a major part of risk allocation, such as long-term financial viability, regular

environmental impact assessments, and community engagement, so as to ensure that the infrastructure projects are both sustainable and meet the needs of the people they are being built for. As such, risk allocation strategies require innovative approaches to risk allocation in the context of sustainable infrastructure projects. From the context of Saudi Arabia, risk allocation also has to factor in the country's legal framework, institutional capacity, and social dynamics when looking at how existing risk allocation models can be adapted, or new models can be developed to meet the needs of the PPPs.

This research seeks to answer the following questions:

- How do existing risk allocation practices in Saudi Arabian PPPs meet infrastructure projects' new sustainable development goals?
- What are the limitations and challenges that existing risk allocation models have in the context of sustainable infrastructure development within PPPs?
- How can risk allocation strategies be modified or new models designed to promote financial viability, environmental sustainability, community engagement, and social responsibility in Saudi Arabian PPPs?

The Importance and Objectives of the Research

Examining the relationship between PPPs and risk allocation strategies in Saudi Arabia's sustainable infrastructure development is important for several reasons. It allows us to better learn and understand more about the country's existing practices and whether they have been effective when it comes to achieving sustainability goals. The research findings can also go a long way in facilitating the development of more relevant and effective risk allocation frameworks and best practices tailored to the Saudi context. Finally, the study aims to provide

valuable insight into how Saudi Arabia and other nations with similar ambitious goals can use PPPs, especially when it comes to sustainable infrastructure development, transfer of technology, and long-term creation of job opportunities and economic growth.

The research aims to achieve the following objectives:

- Identify and critically analyze the limitations of the risk allocation strategies used by companies in Saudi Arabia, particularly when it comes to PPPs focusing on sustainable development.
- Analyze and establish how effective different risk allocation models are when it comes to various types of sustainable infrastructure projects that are to be done via PPPs.
- Make recommendations that focus on developing risk allocation frameworks whose focus is on financial viability, environmental sustainability, and social responsibility in Saudi Arabian PPPs.
- Contribute to the broader discussion on whether to embrace PPPs and the risk management frameworks that need to be put in place, especially when incorporating sustainable development in Saudi Arabia.

Research Hypotheses

Based on the identified research problem, the following hypotheses can be formulated:

- Hypothesis 1: Current risk allocation practices in Saudi Arabian PPPs focus on short-term financial gains at the expense of long-term environmental and social sustainability goals.

- Hypothesis 2: Many of the existing risk allocation models do not incorporate sustainability and thus cannot address the specific challenges and complexities of sustainable infrastructure development within PPPs.
- Hypothesis 3: Implementing innovative risk allocation strategies, such as shared-risk models and performance-based contracts, can significantly improve the financial viability, environmental sustainability, and social responsibility of Saudi Arabian PPPs.

Literature Review

Global Trends in PPPs and Sustainable Infrastructure

There is a growing demand for infrastructure as the global population continues to grow and nations become wealthier over time. The global infrastructure gap is estimated to reach \$15 trillion annually by 2040 (Naladekoba, 2022). It is unlikely that public funding will be sufficient to meet all of the infrastructure needs; thus, innovative solutions are needed to fill the gap. Public-private partnerships can play an important role in bridging this gap as they not only allow for collaboration between the private and public sectors but also allow for private sector capital and expertise to flow into infrastructure that is to be used by the general public.

In recent years, there has been a strong emphasis on sustainability. Due to growing environmental concerns, many governments and the general public are advocating for the development and financing of projects that are sustainable in nature. (Munyasya & Chileshe, 2018). These include projects that incorporate concepts such as using renewable energy, energy efficiency, green buildings, sustainable water management and wastewater reuse, and climate-resilient infrastructure. With sustainability becoming an integral part of infrastructure building, a

project must select the most suitable sustainability project that will not end up being costly to maintain in the long term while also providing a benefit to the public.

The current PPP models often emphasize using private capital to build the infrastructure. In turn, the private entity operates the infrastructure for a period during which it is able to charge for the use of the infrastructure at market rates; then, it eventually transfers the asset back to the public sector. The models that fall under this system are the Build-Operate-Transfer (BOT) model, the Design-Build-Finance-Operate (DBFO) model, and public-private partnerships for availability (PPPAs), which incentivize performance and efficient operation.

Saudi Arabia and PPPs: Opportunities and Challenges

Under Vision 2030, Saudi Arabia needs to invest considerably in infrastructure with the aim of job creation, technology transfer, and economic diversification. PPPs offer both huge opportunities and pose a number of challenges regarding their role in infrastructure development.

Opportunities

PPPs are an easy and low-cost way of attracting private-sector capital with the aim of addressing the issue of financial shortfalls from public coffers at a time when significant financial resources are needed for infrastructure development (Biygautane, 2023). Another opportunity is when it comes to enhancing efficiency. The public sector is often characterized by low efficiency and productivity. PPPs work to bring efficiency, innovation, and best practices from the design of the project and, once constructed, how the project is operated in the long term, leading to efficient systems, cost savings, and high ROI from the project. From the context of Saudi Arabia's Vision 2030, PPPs will play a major role in diversifying Saudi Arabia's economy, particularly through the process of technology transfer, where Saudi nationals in the public sector

gain skills from the private sector, which, over time can be used to maintain the infrastructure built, particularly if the PPP is using the BOT or DBFO model.

Challenges

One challenge is in Saudi Arabia's legal and regulatory framework. To some degree, Saudi Arabia remains a highly regulated economy in some sectors. Thus, many private sector participants in PPPs feel that the current legal framework transfers a lot of the risks to the private sector. As such, the legal and regulatory framework needs to be adjusted with the aim of ensuring that risks and rewards are allocated fairly between the public and private sectors (Biygautane, 2023). Essentially, Saudi Arabia's legal and regulatory framework should strike a balance between attracting private sector capital and participation while at the same time protecting public interests.

Another challenge is capacity building. For a long time, the Saudi public sector has been bloated, and a large percentage of the workforce lacks the expertise to play a role in PPPs. As such, there is a need for training and development programs that help the workforce develop the expertise needed in areas like project development, risk assessment, and contract management to utilize PPPs effectively (Biygautane, 2023). Transparency throughout this process is crucial so as to ensure that a competent workforce emerges over time, fair competition, and public trust.

Another major challenge is in Project selection and structuring. Given that the process of selecting the right projects for PPPs and structuring them based on the Saudi context is essential for their success, one has to look at a wide range of variables, such as project risks, affordability, and long-term sustainability.

Global Experiences and Lessons Learned

PPPs have been used widely across the globe, and thus, Saudi Arabia can learn from past and existing PPPs to navigate the challenges that PPPs bring to a sector and maximize their potential. One area that risk planners can focus on is looking at the successful PPP models in various countries across the globe, especially those with similar cultural ties to Saudi Arabia, like the UAE, as well as in places where PPPs have long been implemented successfully, such as in China, the United States and the European Union (Biygautane et al., 2018). Such models can provide valuable insights for project design and implementation of sustainable projects. When the PPP involves an international organization, sharing best practices can facilitate the process of knowledge transfer and allow for the necessary adjustments for the project to fit into the Saudi context (Biygautane et al., 2018). From a risk management perspective, the focus would be on the development of robust risk management frameworks aimed at addressing a wide range of risks, such as project overruns, environmental concerns, bureaucracy, and the country's economic conditions.

Risk Allocation in PPPs

Risk allocation is the process through which a decision is made on deciding who bears the cost and/ or reaps the benefit of various project risks. If done well, it enhances project efficiency while, at the same time, also ensuring that both parties share responsibility for the project (Jubair & Singh, 2022). The main principles of PPP Risk allocation include efficiency, which ensures that the risks are spread out in a manner that the party best able to manage them is in charge of the risk and is able to handle them at the lowest cost; fairness, where both the private and public sector are allocated risks in a fair and balanced manner based on the expertise and contributions of both sectors; transparency, whereby the process is done in a manner in which

there are no grey areas and thus, lowers the risk of potential disputes. Another principle is direct risk sharing, whereby collaboration and shared responsibility are encouraged to not only foster a sense of partnership but also enable both parties to collaborate when it comes to risk mitigation.

Common PPP Risks and Potential Allocation

In this case, the ideal approach to use is the Matrix Approach, which is outlined below.

Risk Category	Example Risks	Public Sector Allocation	Private Sector Allocation
Market risks	Major fluctuations in interest rates, sudden changes in commodity prices or exchange rates, supply chain disruptions	Low unless the sector intervenes to bridge the costs of the risks when they occur	High, as they have more exposure to market conditions
Construction risks	Poor site preparation, delays in permit approvals, cost overruns, defects emerging during construction, or unexpected site	The risk is low but can be shared depending on the selected risk transfer mechanisms.	High as the private sector is in charge of construction, especially when it comes to defects and unexpected site conditions

	conditions		
Operational risks	Changes in Consumer tastes and preferences, technological changes, or regulatory changes that directly impact the project	The public sector may provide guarantees that minimize such risks, especially when it comes to regulatory changes, which may include clauses that provide immunity to the private entity for the period it is building and operating the project.	High as they are in charge of operations
Political risks	Changes in government policies, laws, and regulations. changes in Local government policies	High as political risks come from the government	Limited as they have limited control over political events

Other Approaches to PPP Risk Allocation

- **Contractual Clauses:** Contractual clauses outline each party's risk allocation and mitigation strategies (Almarri et al., 2019). It is very similar to the Matrix

approach, except that contractual clauses focus on collaboration between the two parties regarding both allocation and mitigation, unlike the Matrix approach, which focuses only on allocation.

- **Risk Transfer Mechanisms.** Risk transfer mechanisms include warranties, guarantees, and insurance to transfer specific risks to the party best equipped to manage them. In most PPPs, the public sector is often obligated to provide guarantees that ensure that the project is completed even when the market and economic conditions change.

Benefits of Effective Risk Allocation

There are several benefits that come with effective risk allocation. One benefit is improved project success rates as both the public and private sectors have clear responsibilities, ensuring that the chances of disputes are minimized. If done optimally, it leads to improved cost efficiency, which lowers the project's cost. A successful PPP with efficient risk allocation mechanisms can, in the long term, encourage the private sector to collaborate more with the public sector, thus leading to the private sector playing a significant role in sustainable infrastructure development (Almarri et al., 2019). Overall, effective PPP risk allocation allows for both the private and public sectors to collaborate effectively, manage risks proactively, and contribute to the delivery of valuable infrastructure and public services.

Sustainable Infrastructure Development in Saudi Arabia:

Saudi Arabia's Vision 2030 provides an extensive and comprehensive roadmap outlining how Saudi Arabia aims to diversify its economy, wean itself off its dependence on oil, and focus on sustainable development (Saudi Vision 2030, 2024). The plan is highly ambitious and recognizes infrastructure's role in meeting the vision's goals. Some of the areas the vision focuses on include

the development of smart and sustainable cities, diversifying the economy by focusing on sectors like the service industry and manufacturing, which the PPPs infrastructure projects will support, and overall, improving the quality of life for the average Saudi citizen(Saudi Vision 2030, 2024). As such, sustainable infrastructure is a major pillar of Vision 2030, and PPPs can play a major role in attracting both private capital and enhancing the efficiency of the use of public funds aimed at achieving them.

Since 2016, several policies have been created with the aim of promoting sustainable infrastructure development and facilitating PPP projects. They include The National Transformation Program (NTP) (Saudi Vision 2030, 2024). This is Saudi Arabia's core program aimed at economic diversification through setting specific targets, how they will be achieved, and the role sustainable infrastructure will play in various sectors like transportation, energy, and water. Another policy is the Saudi Vision 2030 Real Estate Sector Strategy(Saudi Vision 2030, 2024). This policy specifically focuses on constructing and maintaining sustainable and smart cities with highly efficient infrastructure systems, allowing for the seamless movement of people and goods while supporting a high quality of life. Through various agencies and ministry policies, Saudi Arabia has been trying to streamline the process of setting up PPPs to attract private capital. Some of the policies include providing tax breaks and guarantees, promoting sustainable practices, and defining clear guidelines for PPP projects.

Despite Saudi Arabia actively promoting PPPs, it still faces several challenges. The country lacks the expertise to manage complex PPP projects; thus, foreign companies continue to dominate some sectors regarding PPPs (Biygautane et al., 2018). While Saudi Arabia has made extensive reforms, it continues to have a large bureaucracy, making the approval process time-consuming and complex (Biygautane et al., 2018). Standardized PPP contracts have yet to

become the norm in Saudi Arabia; thus, there is still some degree of uncertainty, discouraging PPPs from certain projects.

Research Methodology

The research paper will combine both qualitative and quantitative data collection and analysis techniques.

Qualitative Methods

In this case, direct interviews with key stakeholders involved in PPPs in Saudi Arabia, both government officials and private sector representatives, will be done, and their responses will be collected. This process will also involve the analysis of government documents, project reports, and policy frameworks.

Quantitative Methods

When it comes to qualitative methods, the focus will be on analyzing existing PPPs in Saudi Arabia, focusing on financial performance, environmental impact assessments, and social impact. When it comes to quantitative methods, the focus will be on developing and applying various statistical methods that will be used to either validate or nullify the outlined hypotheses and identify relationships between risk allocation strategies and project outcomes(Walliman, 2021).

Data Analysis

Thematic analysis will be used to establish various trends and patterns from the interviews and document reviews, while various statistical methods will be based on descriptive analysis due to the nature of the data and research questions that will be asked.

Research Limits

Some of the data limits include restrictions on data collection due to the sensitivity of some information for both the project documents and during interviews. Another limitation is that the scope will be confined to infrastructure development and the few PPP projects that have taken place in that sector. Another limitation is that the findings may apply to Saudi Arabia but may not be appropriate for application in other nations with different economic conditions.

Ethical Considerations

Before data collection, informed consent will be sought from all interview participants to ensure that the data collected is private and confidential. Ethical research practices will be maintained throughout the entire research process, aligning with the guidelines provided by both the University and the participating institutions.

Conclusion

Overall, this research proposal outlines a comprehensive plan aimed at exploring the relationship between PPPs and risk allocation strategies in managing sustainable infrastructure development in Saudi Arabia. The proposal tries to address the research problems and objectives while employing a mixed-methods approach to analyze the data collected via qualitative and quantitative methods. As such, the final research will aim to add valuable knowledge and insights into existing PPPs and how risk allocation strategies can be deployed. Thus, the findings can be used in policy-making in Saudi Arabia and other developing countries that aim to use PPPs for sustainable infrastructure development.

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