



Stakeholder Management in Indian PPP Projects: A case study of Jewar Airport

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Abstract : The construction projects are traditionally divided into a series of activities or operations undertaken by various individuals or groups, each with differing levels of interest and involvement. The complex and lengthy design and execution processes in construction projects necessitate collaboration and negotiation among numerous stakeholders. The individuals and groups involved, both directly and indirectly, are referred to as project stakeholders. Managing the relationships between the project and its stakeholders is key because stakeholders control information and resources, giving them significant power. Project managers must engage stakeholders to meet their varying demands, thereby improving decision-making effectiveness and efficiency throughout the project lifecycle. If stakeholders are dissatisfied with the project's quality or management, adjustments in scope, time, and cost may be required to align with their expectations. Public-Private Partnership (PPP) projects, widely adopted for large-scale infrastructure development, introduce a collaborative approach between the public and private sectors. These projects allow for shared risks and resources but involve diverse stakeholders with different objectives, making stakeholder management (SM) even more critical for success. Effective SM in PPPs ensures alignment of interests, smooth communication, and conflict resolution throughout the project lifecycle—factors essential for timely and budget-compliant project delivery. However, stakeholder management in PPP projects is particularly complex due to the long-term nature of these partnerships, often spanning decades, and the need to balance public and private interests. Ineffective SM can lead to conflicts, delays, and cost overruns, jeopardizing the project's viability. Despite its importance, there is limited research specifically addressing the tools, techniques, and strategies for stakeholder management in PPPs. This study aims to fill that gap by examining the role of stakeholder management in PPP projects, identifying key stakeholders, analyzing the major challenges, and proposing a comprehensive framework to enhance collaboration and project outcomes.

IndexTerms - Stakeholders, Stakeholder Management, Public-Private Partnership (PPP), Project lifecycle, Critical success factors (CSFs)

I. INTRODUCTION

In India, PPPs have become a critical strategy for addressing the country's infrastructure deficit. India's PPP market is one of the largest globally, with over 1,000 projects currently in the pipeline (Aayog, 2023). Globally, despite the widespread adoption of PPPs, there have been multiple instances of project failures. One of the most significant causes of failure is poor stakeholder management (SM), which leads to strained relationships between project partners ((El-Gohary, 2006); (Henjewe, 2013); (De Schepper, 2014)). Additionally, many issues in PPP projects can be traced back to inefficiencies in the SM system.

Although the literature underscores the importance of stakeholder management for PPP success, there is a lack of research on SM in PPP projects. De Schepper et al. (2014) also note the scarcity of research focused on effective stakeholder management in PPP projects, even though SM is recognized as one of the key success factors for PPP implementation. Stakeholder management plays a critical role in ensuring the success of construction projects, especially in the complex and dynamic environment they operate in. Mismanagement in this area can have serious consequences, leading to cost overruns, delays, and strained relationships with key stakeholders. Stakeholders hold significant influence over project decisions, and their involvement—or lack thereof—can determine a project's success or failure. Stakeholders can affect many aspects of a project such as scope, schedule, cost, project team, plans, outcomes, culture, risks, quality etc. (PMBOK Seventh Edition, 2021) According to the Project Management Institute ((PMI), 2013), a project is deemed a failure if the stakeholders are dissatisfied with its outcome. Therefore, to enhance the delivery of construction projects, construction managers must develop strong stakeholder management skills. This study seeks to address this gap by exploring key challenges, identifying critical stakeholders, and examining success factors that can enhance collaboration and improve project performance in PPPs.

This research aims to identify key stakeholders, address challenges, and develop a framework for effective stakeholder management in Indian Public-Private Partnership (PPP) projects. It examines stakeholder roles, challenges, management techniques, and strategies for improvement, with Jewar Airport as a case study to highlight real-world practices. The study focuses on identifying key stakeholders and their responsibilities, analyzing challenges and success factors in stakeholder management, and evaluating existing management techniques in PPP projects. By assessing current practices, it aims to propose strategies that enhance stakeholder collaboration, mitigate conflicts, and improve project outcomes. Key research questions include identifying stakeholders and their specific roles, understanding the challenges and success factors influencing stakeholder

management, analyzing management techniques used in PPP projects with insights from Jewar Airport, and proposing strategies to address inefficiencies and improve stakeholder engagement in future PPP projects. Through this study, a comprehensive framework for effective stakeholder management will be developed, contributing to better project execution and success.

II. LITERATURE REVIEW

Stakeholders can be individuals, groups, or organizations that may affect, be affected by, or perceive themselves to be affected by a decision, activity, or outcome of a portfolio, program, or project. Stakeholders also directly or indirectly influence a project, its performance, or outcome in either a positive or negative way (PMBOK Seventh Edition, 2021).

Table 1. Summary of literature review on digital transformation in the construction industry (Source: Author)

Types of Stakeholders	Classification Criteria	References
External and Internal Stakeholders	Contractual Relationship, Level of influence	(Cleland, 1999; Winch, 2010)
Primary and Secondary Stakeholders	Decision making, Importance, Influence on the project	(Newcombe, 2003; Smith and Love, 2004; Calvert, 1995)
Direct and Indirect Stakeholders	Type of relationship	(Smith and Love, 2004)
Supportive, Anti and Neutral Stakeholders	Stakeholder attitude	(Aaltonen et al., 2008; Chinyio and Akintoye, 2008)
Key and Non-Key Stakeholders	Direct Impact, Dependency on the project	(Salam & Noguchi, 2006)
Inside and Outside Stakeholders	Affiliation with the organization, engagement in the project, Impact	(Newcombe, 2003)

Stakeholder management (SM) frameworks in construction have evolved to offer structured approaches for engaging with stakeholders throughout a project’s lifecycle. Numerous frameworks in the literature provide step-by-step guidance for identifying, analyzing, and engaging stakeholders to ensure project alignment and minimize risks. Collectively, SM frameworks generally categorize the stakeholder management process into four main stages: stakeholder analysis (SA), stakeholder engagement (SE), action planning (SMA), and monitoring (SMO).

Stakeholder analysis (SA) is a technique of systematically gathering and analyzing quantitative and qualitative information to determine whose interests should be taken into account throughout the project. It includes identification of all potential stakeholders, their relevant information and influence levels. Subsequently, to identify the potential impact or support each stakeholder could generate, and classify them so as to define an approach strategy.

Stakeholder engagement (SE) attempts to minimize the conflicts between project stakeholders and to explore the project priorities clearly throughout the project life cycle by effective involvement of project stakeholders (Deegan & Parkin 2011, Webler & Tuler 2000). Stakeholder Management Action (SMA) is the process to plan and develop implementation best practices for dealing with different stakeholders. SMA emphasizes the importance of a systematic approach to engage stakeholders throughout a project’s lifecycle. Stakeholder Management monitoring (SMO) is defined as the process of following up on the best practices and actions that have been implemented. This approach allows project stakeholders to reassess, reprioritize, and adapt the SM plans as the project progresses. (Olander, S., 2007)

Stakeholders’ interests and influences are not constant and can vary from one stage to another and even from time to time in a particular stage of the project lifecycle (Aaltonen, K.; Sivonen, R.; Ikävalko, H., 2008). This is an indication of the dynamic relationships that exist among the stakeholders themselves as well as between the stakeholders and the project which also shows that events and actions are interdependent on each other. Synthesizing different perspectives from the literature, six core stages of a PPP project lifecycle can be identified– (1) Project Initiation (Concept Planning and feasibility); (2) Bid Process (Tendering, negotiation and award); (3) Detailed Design Development; (4) Construction ; (5) Testing and Commissioning (6) Operation and Maintenance. In construction projects numerous stakeholders are involved right from the inception of the project to completion of the project. Some stakeholders join in during the course of the project while some stakeholders are involved in the project even after it has been completed. In Public-Private Partnership (PPP) projects, multiple stakeholders are involved, each playing a critical role in ensuring the project's success.

Table 2. Stakeholder groups in PPP projects

GROUPS		STAKEHOLDERS
External stakeholders	Public entity	Government (National and State), Approving Authorities, Regulatory Bodies
	Private Partners	Concessionaire
	Financers	Banks , Financial Institutions, Investors/Lenders
	Others	Media, NGO/Activists, Technical Consultants, Marketing Consultants
	Society	Customers/End-users, Local communities/land owners
SPECIAL PURPOSE VEHICLE (SPV)		
Internal stakeholders	Contractor	EPC Contractor
	Project Team	Architect, Consultants (Structural/MEP), PMC/Project Manager, Client Representative (Public entity), Finance Team, Commercial Team
	Consultants	Independent Engineer
	Vendors and Service Providers	Vendors/Suppliers, Service Providers, Commercial Partners
	Operation and Maintenance Team	Facility Managers

(Chinyio, E.; Akintoye, A., 2008) asserted the importance of stakeholder management (SM) in modern forms of construction procurement, such as partnering and private finance initiatives. Poor management of stakeholder relationships is one of the main reasons for the failure of many PPP projects in the global context (Henjewe, 2013).

Table 3. Issues in PPP projects due to stakeholder management (Source: Author)

Issues	Johnston & Kouzmin (2010)	El-Gohary et al. (2006)	Henjewele et al. (2013)	De Schepper et al. (2014)	Kwak et al. (2009)	Regan et al. (2011)	Jayasuriya et al. (2018)	Siddiquee (2011)
Overlapping Responsibilities Among Government Agencies	X	X			X		X	
Political Influence on PPP Decisions	X		X					X
Inadequate Stakeholder Monitoring During Operations	X		X	X				
Inefficient Conflict Management Between Sectors	X		X	X		X		
Challenges in Stakeholder Identification through lifecycle	X		X				X	
Delayed or Insufficient Early Consultation	X		X				X	
Public Interest Overlooked	X		X	X				X
Insufficient Public Communication	X		X	X		X		
Staff Capability Deficiencies					X	X		X
Unstable Financial Support			X		X	X		X
Difficulty in assessing expectations of each stakeholder				X			X	
Lack of interaction with stakeholders	X			X	X			
Lack of Structured Feedback Mechanisms		X	X				X	

2.1 Case Study 1: Delhi Indira Gandhi International Airport (IGIA)

DIAL was set up as a Special Purpose Vehicle (SPV) to oversee the airport’s development, operations, and management. DIAL won the concession contract for 30 years on January 31, 2006, under the Operations, Management, and Development Agreement (OMDA). The agreement, which governs investment, design, construction, and operation, extends to 2036, with an option for a 30-year extension.

The Delhi Airport PPP project faced challenges such as cost overruns, stakeholder coordination issues, CAG criticism over lease terms, human resource adaptation to automation, lack of transparency in the bidding process, scope changes leading to financial strain, and time constraints due to the Commonwealth Games deadline. Key lessons for future PPP projects include the need for a streamlined and transparent bidding process, effective multi-stakeholder coordination, balanced public-private interests, regulatory preparedness, flexible funding and contractual terms, pre-bid simulations to prevent disputes, broader stakeholder mapping, and transparent communication with regulators. Despite its complexities, the project successfully modernized India’s aviation infrastructure while highlighting the importance of robust stakeholder management, financial sustainability, and proactive planning.

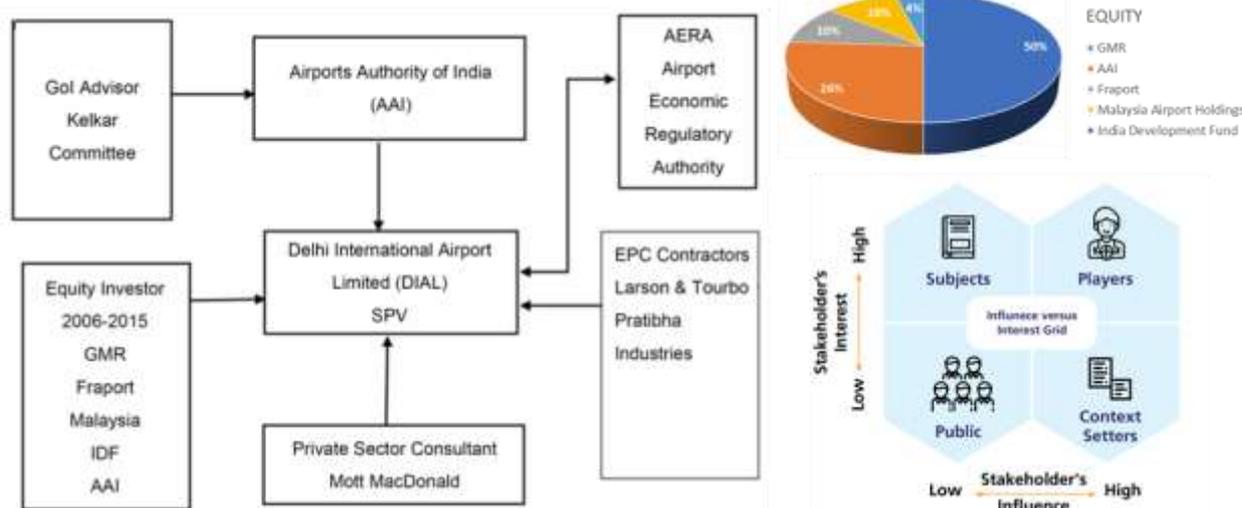


Figure 1. Stakeholder framework for IGAI

2.2 Case Study 2: Kempegowda International Airport (Bangalore)

The BIAL project operates under a Build-Own-Operate-Transfer (BOOT) model, giving BIAL the exclusive right to manage and develop the airport for an initial 30-year period, extendable by another 30 years. BIAL’s success in the PPP model was driven by strong private consortium involvement, unified government support, transparent tariff regulation, integrated infrastructure planning, and the development of an economic zone around the airport. However, challenges such as delayed land acquisition, scope changes leading to cost overruns, an extended bidding process, refinancing issues, and tariff disputes highlighted key areas for improvement. The project emphasized the need for streamlined land acquisition, clear contractual terms, efficient pre-construction timelines, predefined refinancing mechanisms, and transparent tariff guidelines. Overall, BIAL’s experience underscores the importance of dynamic stakeholder management, proactive governance, and balanced public-private collaboration to ensure the stability and efficiency of future airport PPP projects in India.

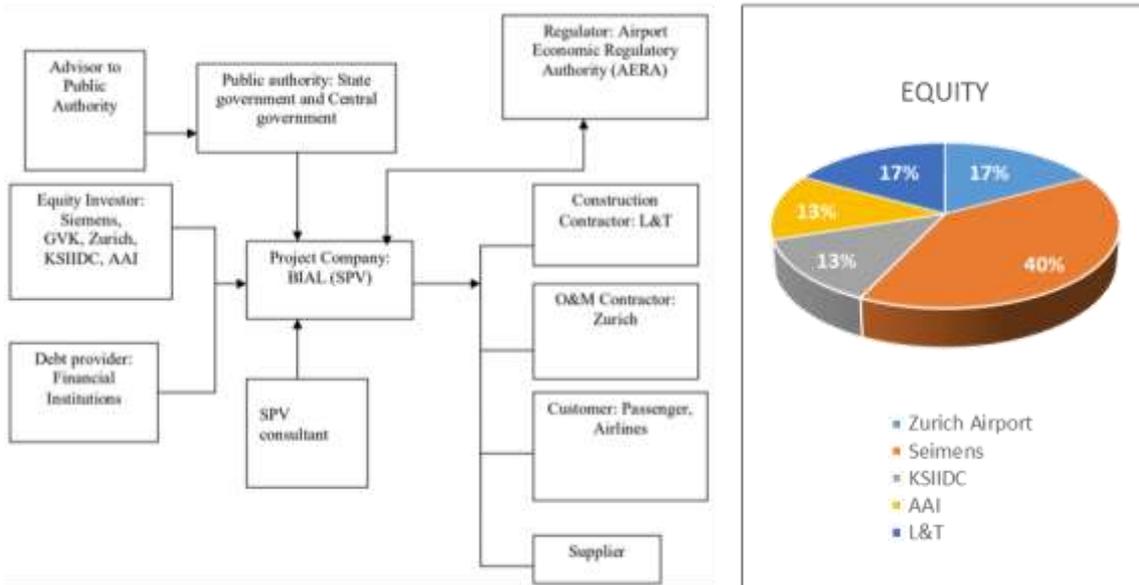


Figure 2. Stakeholder framework for Bangalore Airport

2.3 Case Study 3: Jewar Airport (Noida International Airport)

The Jewar Airport project, led by Noida International Airport Limited (NIAL). Operating under a 40-year concession agreement, the airport follows a "design, build, operate, and manage" model. NIAL holds a "golden share" in Yamuna International Airport Pvt. Ltd. (YIAPL), a subsidiary of Zurich Airport International, granting it strategic oversight and the right to appoint two directors while Zurich Airport leads daily operations.

The Jewar Airport project follows a structured stakeholder management process led by the Stakeholder Coordination and Program Team, which ensures seamless communication and collaboration among all involved parties. Stakeholders in the project have been categorized into two primary groups: external and internal stakeholders. External stakeholders include government authorities such as the DGCA, MoCA, CISF, AERA, and APHO, along with financial partners and customers who were engaged early in the pre-tendering phase. Internal stakeholders include Yamuna International Airport Limited (YIAPL), the EPC contractor (Tata Projects), the PMC (Jacobs), fuel infrastructure providers (Indian Oil Skytanking), baggage handling system suppliers (Siemens), and concessionaires (Bird Group, Heinemann Asia Pacific, etc.).

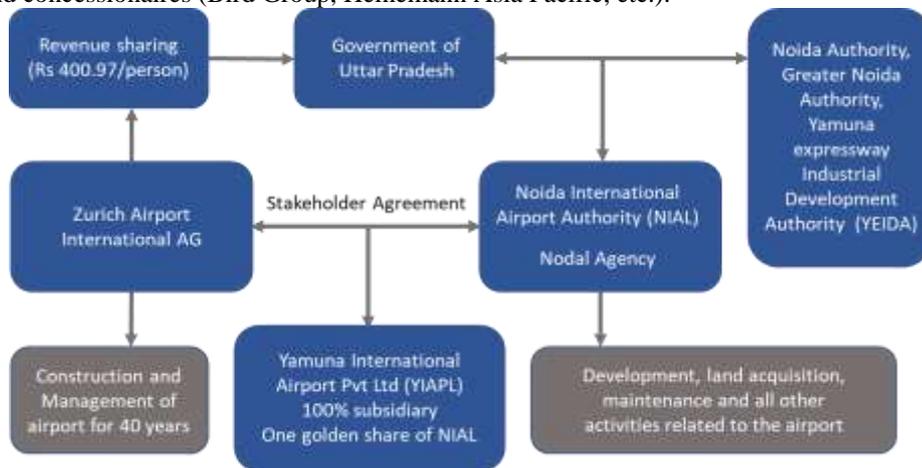


Figure 3. Stakeholder Management for Jewar Airport

To ensure smooth engagement, a Stakeholder Management Framework was established, dividing interactions into strategic-level engagement, involving high-level decision-makers such as Zurich Airport’s leadership and regulatory authorities, and working-level engagement, which involves operational teams responsible for implementing project activities and aligning them with regulatory requirements. A key aspect of the project’s stakeholder strategy was prioritization, achieved through an Influence-Impact Matrix, which categorized stakeholders based on their influence and impact on the project. This framework allowed the project team to tailor engagement strategies accordingly: stakeholders with low influence and low impact were simply informed, while those with high impact but low influence were consulted to gather feedback.

Key stakeholders with high influence and high impact, such as NIAL and YEIDA, were actively involved in decision-making, while those with the highest level of influence were empowered to drive major project decisions. To facilitate ongoing discussions and alignment, a Joint Coordination Committee (JCC) was formed, conducting quarterly meetings to address conflicts and ensure cooperation. Additionally, public engagement efforts such as surveys and roadshows were conducted to gather feedback and raise awareness among local communities. Throughout the project, a Stakeholder Register was maintained to track engagement levels, stakeholder roles, and potential risks.

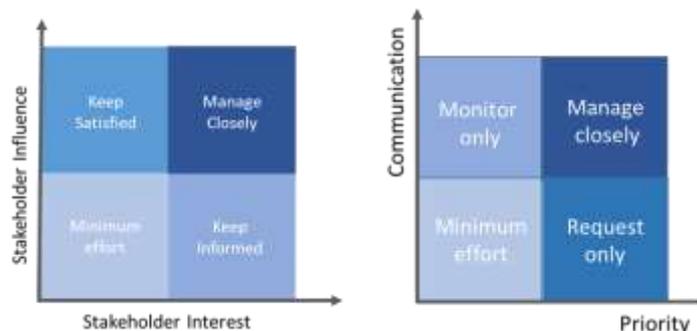


Figure 4. Stakeholder Management strategies adopted for Jewar Airport

Despite a well-structured engagement framework, the project faced several challenges. Land acquisition and compensation disputes led to community protests, which were managed through transparent negotiations and dialogue. Regulatory approvals required extensive coordination with authorities like MoCA and DGCA, often leading to delays. Moreover, the public-private nature of the project demanded close coordination between NIAL, YEIDA, and Zurich Airport AG, which was facilitated through frequent meetings. Environmental concerns also emerged as a critical issue, which was addressed through sustainability measures and stakeholder consultations.

The Jewar Airport project demonstrates several best practices in stakeholder management, such as early stakeholder identification, structured prioritization using the Influence-Impact Matrix, regular JCC meetings for conflict resolution, proactive public engagement through surveys and roadshows, and the use of a stakeholder register for risk monitoring. However, some shortcomings were noted, including the lack of Key Performance Indicators (KPIs) to measure stakeholder management effectiveness, limited continuous public engagement beyond the initial surveys, and inconsistent public awareness efforts, which led to evolving concerns among the affected communities.

2.4 Stakeholder Management Best Practices

The SM best practices proposed should solve the current and emerging issues related to SM. The literature review and the three case studies contributed significantly to the development of a comprehensive list of best practices for stakeholder management in PPP projects. These best practices, which span the entire lifecycle of PPP projects, are crucial for ensuring effective management throughout each stage. The identified practices were organized according to the six stages of PPP development, demonstrating their applicability across the entire project lifecycle.

Table 4. Best Practices in Stakeholder Management for PPP Projects (Source: Author)

Best practices in successful SM	Stages in a PPP project					
	PI	BP	DD	CO	T&C	O&M
Stakeholder Analysis						
Identification of all stakeholders through project lifecycle	X					
Classify and assess stakeholder attributes to prioritize	X					
Align stakeholder needs and expectations	X	X	X			
Identify long-term stakeholder risks and potential conflicts	X	X		X		
Understanding of each other’s objectives (Govt. & private)	X	X	X			
In-depth analysis of political expectations in the public sector	X					
Document all commitments made to stakeholders	X	X				
In-depth analysis of opposite & aligned views within stakeholders	X	X	X			
Stakeholder Engagement						
Honest & Transparent Communication	X	X	X	X	X	X
Timely and Clear Information Distribution	X	X	X	X	X	X
Early Stakeholder Consultation	X	X				
Stakeholder Involvement in Bid Assessment		X				
Public Accessibility of Information	X	X				X
Establish community advisory groups	X					X
Agreement on Project Brief by relevant parties	X	X	X			
Continuous stakeholder interaction	X	X	X	X	X	X
SM action plan						
Collaborative Public-Private Model	X	X	X	X	X	X
Defined roles and responsibilities	X	X				
Conflict resolution mechanisms	X					
Skilled project leader and employee training	X					
Integrate stakeholders into strategy process	X		X			
Ensure responsibilities do not overlap between govt. agencies	X				X	X
Identify suitable strategies to influence stakeholders	X					
Joint decision making between stakeholders	X	X	X	X	X	X
Documentation and strategy evolution	X	X	X	X	X	X
Stakeholder monitoring						
KPIs for each stakeholder category	X		X			X

Regular Monitoring and Reporting	X	X	X	X	X	X
Transparent Financial Management to public	X	X				
Long term engagement of stakeholders	X					X
Review and update analysis throughout the project lifecycle	X	X	X	X	X	X
Develop feedback mechanisms and incorporate lessons learnt	X	X	X	X	X	X
Stakeholders	Stages in a PPP Project					
	PI	BD	DD	CO	T&C	O&M
Public Entity	X	X	X	X	X	X
Approving and Regulatory Bodies	X	X		X		
Private Concessionaire	X	X	X	X	X	X
Financers (Banks/Investors)	X	X	X	X		
Special Purpose Vehicle (Project Team)	X	X	X	X	X	X
Marketing Consultants		X	X			
Contractor		X	X	X	X	
Technical Consultants		X	X	X	X	
Vendors and service providers		X	X	X	X	X
Facility Managers						X
Customers/ End-users						X
Local communities/ Land owners	X					X

III. RESEARCH METHODOLOGY

This study employs a mixed methods research approach, integrating both quantitative and qualitative methodologies into a cohesive research design. The research process began with an extensive literature review aimed at identifying gaps in existing research related to Stakeholder Management (SM). This foundational work helped refine the focus of the study and establish its aims, objectives, and research questions.

The research commenced with a qualitative phase, wherein semi-structured interviews were conducted to gather insights from stakeholders. These interviews provided a holistic view of SM within PPPs, enriching the understanding of key issues faced by various stakeholders involved in such projects. The qualitative data obtained were analyzed through content analysis, resulting in a comprehensive list of SM-related challenges and best practices. In addition to the interviews, a primary case study of Jewar Airport was conducted to investigate current SM practices and the real-world challenges stakeholders’ encounter. This case study offered valuable insights into the practical aspects of SM in PPP projects and helped identify effective strategies for overcoming these challenges. The findings from the Jewar Airport case study significantly contributed to the overall understanding of SM dynamics and informed the development of a comprehensive list of best practices designed to address specific challenges encountered in similar projects.

Following the qualitative phase, insights gathered from the literature review, semi-structured interviews, and the Jewar Airport case study informed the development of a questionnaire. This questionnaire was deployed through an online survey, and the collected data were analyzed using RII and FMEA analysis. In the context of stakeholder management, FMEA will help to assess the potential impact of each stakeholder’s influence on the project, considering their power to affect outcomes, the urgency of their concerns, and the legitimacy of their claims. By applying this analysis, stakeholders will be prioritized in each project phase according to these factors, ensuring that resources are focused on the most critical stakeholder interactions and facilitating more effective risk management throughout the project lifecycle.

IV. RESULTS AND DISCUSSION

Relative Importance Index (Best Practices in SM) - To study the best practices adopted in PPP projects, a survey was conducted among experts working in this domain in India, gathering a total of 11 responses. The findings highlighted key practices with high Relative Importance Index (RII) scores across four major areas. In stakeholder analysis, identifying long-term risks (0.873) and conducting comprehensive stakeholder identification (0.855) emerged as critical practices. In terms of stakeholder engagement, continuous interaction (0.891) and early consultation (0.873) were identified as essential for effective collaboration. Action planning was emphasized through the implementation of conflict resolution mechanisms (0.945) and joint decision-making processes (0.873). Lastly, monitoring efforts focused on developing robust feedback mechanisms and incorporating lessons learned (0.836) to enhance future stakeholder management strategies.

RESPONDENT’S DATA						RII CALCULATIONS								
Parameters	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	TOTAL	(AXN)	RII	Rank
	Stakeholder Analysis													
Identification of all stakeholders through project lifecycle	7	2	1	0	1	35	8	3	0	1	47	55	0.855	2
Classify and assess stakeholder attributes to prioritize	4	5	2	0	0	20	20	6	0	0	46	55	0.836	3
Align stakeholder needs and expectations	5	4	1	0	1	25	16	3	0	1	45	55	0.818	4

Identify long-term stakeholder risks potential conflicts	7	3	0	0	1	35	12	0	0	1	48	55	0.873	1
Have a good understanding of each other's objectives (Govt. and private consortium)	4	3	1	2	1	20	12	3	4	1	40	55	0.727	7
In-depth analysis of the political expectations in the public sector	2	4	2	1	2	10	16	6	2	2	36	55	0.655	8
Document all commitments made to stakeholders	3	5	3	0	0	15	20	9	0	0	44	55	0.8	5
In-depth analysis of opposite and aligned views within stakeholders groups	2	6	2	0	1	10	24	6	0	1	41	55	0.745	6
Stakeholder Engagement														
Honest & Transparent Communication	6	2	1	1	1	30	8	3	2	1	44	55	0.8	4
Timely and Clear Information Distribution	6	3	1	0	1	30	12	3	0	1	46	55	0.836	3
Early Stakeholder Consultation	6	3	2	0	0	30	12	6	0	0	48	55	0.873	2
Stakeholder Involvement in Bid Assessment	4	3	2	1	1	20	12	6	2	1	41	55	0.745	5
Public Accessibility of Information	2	4	3	2	0	10	16	9	4	0	39	55	0.709	7
Establish community advisory groups	1	6	3	1	0	5	24	9	2	0	40	55	0.727	6
Agreement on Project Brief by relevant parties	2	4	5	0	0	10	16	15	0	0	41	55	0.745	5
Structured feedback mechanisms	6	3	2	0	0	30	12	6	0	0	48	55	0.873	2
Continuous stakeholder interaction	8	2	0	0	1	40	8	0	0	1	49	55	0.891	1
SM Action Plan														
Collaborative Public-Private Model	6	2	2	0	1	30	8	6	0	1	45	55	0.818	6
Defined roles and responsibilities	7	2	1	0	1	35	8	3	0	1	47	55	0.855	4
Conflict resolution mechanisms	9	1	1	0	0	45	4	3	0	0	52	55	0.945	1
Risk allocation	7	1	2	0	1	35	4	6	0	1	46	55	0.836	5
Skilled project leader and employee training	4	4	2	0	1	20	16	6	0	1	43	55	0.782	8
Integrate stakeholders into strategy process	4	3	4	0	0	20	12	12	0	0	44	55	0.8	7
Ensure responsibilities do not overlap between govt. agencies	5	4	2	0	0	25	16	6	0	0	47	55	0.855	4
Identify suitable strategies to influence stakeholders	6	4	1	0	0	30	16	3	0	0	49	55	0.891	2
Joint decision making between stakeholders	5	5	1	0	0	25	20	3	0	0	48	55	0.873	3
Documentation and strategy evolution	4	6	0	0	1	20	24	0	0	1	45	55	0.818	6
Stakeholder Monitoring														
Performance measurements for each stakeholder category (KPIs)	4	3	4	0	0	20	12	12	0	0	44	55	0.8	3
Regular Monitoring and Reporting	5	2	4	0	0	25	8	12	0	0	45	55	0.818	2
Transparent Financial Management to public	2	2	4	3	0	10	8	12	6	0	36	55	0.655	5
Long term engagement of stakeholders	4	3	3	1	0	20	12	9	2	0	43	55	0.782	4
Regularly review and update stakeholder analysis throughout the project lifecycle	3	5	3	0	0	15	20	9	0	0	44	55	0.8	3
Change in strategy if required	3	5	2	1	0	15	20	6	2	0	43	55	0.782	4
Develop feedback mechanisms and incorporate lessons learnt	5	3	3	0	0	25	12	9	0	0	46	55	0.836	1

FMEA Analysis (Stakeholder Importance) - A total of 48 responses were gathered from the survey. The survey was floated to diverse professionals working in the construction industry, with a fair knowledge of PPP projects. The minimum experience required for this survey was 5 years. A priority no. was calculated for each stakeholder (Power X Urgency X Legitimacy) based on which ranks were provided in each stage of the project. A class was also designated to each stakeholder. This is a method to put stakeholders into different categories, based on which a tailor-made stakeholder management strategy can be applied to each group of stakeholder.

The survey, incorporating FMEA and Likert Scale analysis, quantified stakeholder attributes (Power, Urgency, and Legitimacy) across various phases of PPP projects. Stakeholders such as SPV Teams, Contractors, Public Entities, and Private Concessionaires consistently ranked high across phases, with roles evolving based on the project stage:

- Project Initiation: Approving bodies and SPV teams were ranked highest due to their role in feasibility and regulatory clearances.
- Construction: Contractors and SPV teams were critical for execution.
- Operation & Maintenance: Facility Managers and Customers were dominant stakeholders, emphasizing operational success and service delivery.

Table 5. Data analysis for stakeholder impact in phases

Stage	Stakeholder	Power (P)	Urgency (U)	Legitimacy (L)	Priority No.	Rank	Class
Project Initiation (Concept planning and feasibility)	Public Entity	3.96	3.81	3.9	58.84	4	Definitive
	Approving & Regulatory Bodies	3.96	3.75	4.09	60.74	2	Dominant
	Private Concessionaire	3.84	3.9	3.93	58.86	3	Definitive
	Financers (Banks/Investors)	3.81	3.81	3.84	55.74	5	Definitive
	SPV (Project Team)	3.71	4	4.12	61.14	1	Dependent
	Land owners	3.78	3.46	3.81	49.83	6	Dominant
Bid Process	Public Entity	3.96	3.78	3.87	57.93	2	Definitive
	Private Concessionaire	3.68	3.78	4.09	56.89	3	Dependent
	Financers (Banks/Investors)	4.06	3.84	4.06	63.30	1	Definitive
	SPV (Project Team)	3.75	3.59	3.81	51.29	4	Dominant
	Contractor	3.5	3.68	3.62	46.63	5	Definitive
	Technical Consultants	3.68	3.43	3.59	45.31	6	Definitive
Detailed Design Development	Vendors & service providers	3.4	3.34	3.43	38.95	8	Definitive
	Public entity	3.65	3.68	3.75	50.37	4	Definitive
	Private Concessionaire	3.84	3.65	3.78	52.98	3	Definitive
	Financers (Banks/Investors)	3.71	3.46	3.56	45.70	5	Definitive
	SPV (Project Team)	3.96	3.75	3.87	57.47	2	Dominant
	Technical Consultants	4.03	4.21	4	67.87	1	Definitive
Construction	Vendors & service providers	3.53	3.53	3.65	45.48	6	Definitive
	Public Entity	3.81	3.71	3.59	50.75	7	Definitive
	Approving /Regulatory Bodies	3.81	3.81	3.87	56.18	5	Definitive
	Private Concessionaire	3.96	3.9	3.71	57.30	4	Dangerous
	SPV (Project Team)	4.09	4	4.09	66.91	2	Definitive
	Contractor	4.15	4.53	4.09	76.89	1	Definitive
Testing and Commissioning	Technical Consultants	4	4.06	4	64.96	3	Definitive
	Vendors & service providers	3.78	3.68	3.78	52.58	6	Dominant
	Public Entity	3.81	3.71	3.68	52.02	5	Dormant
	Private Concessionaire	4.03	3.68	3.87	57.39	4	Dominant
	SPV (Project Team)	4	3.93	3.96	62.25	2	Definitive
	Contractor	3.93	4	4.06	63.82	1	Definitive
Operation and Maintenance	Technical Consultants	3.68	3.96	4.03	58.73	3	Dependent
	Vendors and service providers	3.59	3.34	3.87	46.40	6	Definitive
	Public Entity	3.87	3.68	3.87	55.11	4	Definitive
	Private Concessionaire	3.9	4	3.84	59.90	3	Definitive
	SPV (Project Team)	3.56	3.43	3.5	42.74	5	Dormant
	Facility Managers	4.28	4.15	4.21	74.78	1	Definitive
Operation and Maintenance	Customers/ End-users	3.84	4.21	4.25	68.71	2	Definitive
	Marketing Consultants	3.37	3.37	3.46	39.29	6	Definitive

IV. CONCLUSION

The Stakeholder Management Framework (SMF) for Public-Private Partnership (PPP) projects integrates stakeholder identification, engagement, monitoring, and strategic action across the project lifecycle. This framework is based on the six project stages, stakeholder attributes, and best practices identified through research and case studies. It provides a systematic approach to manage stakeholders effectively while mitigating risks and ensuring project success.

Table 6. Stakeholder Management framework in PPP projects

Key Stakeholders	Salience Class	Main Best Practices (RII-based)	Broad SM Strategy
STAGE 1 - PROJECT INITIATION			
Public Entity	Definitive. Handle Closely – Actively engage in discussions, align project objectives, and ensure public policy alignment.	Stakeholder mapping and engagement (RII: 0.855); Political expectations management (RII: 0.655)	- List their expectations and document thoroughly. - Align the project goals with other stakeholders' expectations.
Approving and Regulatory Bodies	Dominant. Engage Regularly – Maintain ongoing communication and manage compliance expectations	Stakeholder mapping (RII 0.855); Establish political risk monitoring systems	- Monitor regulatory changes actively. - Establish clear responsibilities between different agencies.
Private Concessionaire	Definitive. Handle Closely – Involve in major decision-	Risk management (RII: 0.8); Good understanding of each	- Align interests with financial and operational goals. - Identify long term

	making; ensure active role in the project.	other objectives (RII: 0.7271)	risks and potential conflicts
Financers (Banks/ Investors)	Definitive. Handle Closely – Regular updates on financials, track disbursements, and manage relationships.	Transparent financial reporting (RII: 0.755); Regular reporting and updates (RII: 0.745)	- Provide regular financial updates. - Address concerns about cost overruns and financial performance.
SPV (Project Team)	Dependent. Engage When Needed – Be responsive to their concerns and consult during crucial decisions.	Early risk identification (RII: 0.82); Clear task delegation (RII: 0.85); Integrate stakeholders in strategy process	- Ensure consistent communication between all project teams. - Analysis of opposite and aligned views and documentation of expectation
Local Communities/Landowners	Dominant. Engage Periodically – Conduct community advisory meetings and provide regular updates on the project.	Community consultation (RII: 0.727); Public accessibility of Information (RII:709)	- Ensure transparent dialogue by forming community advisory groups. - Set up community engagement initiatives.
STAGE 2 – BID PROCESS			
Public Entity	Definitive. Handle Closely – Involve in workshops, ensure full transparency in the bidding process.	Transparent communication (RII: 0.836); Early stakeholder consultation (RII: 0.873)	- Invite feedback from stakeholders to ensure inclusivity in the bidding process.
Approving and Regulatory Bodies	Dominant. Monitor – Keep track of regulatory requirements and engage only when necessary.	Regular Monitoring and Reporting (RII: 0.818)	- Monitor compliance but avoid excessive engagement unless required.
Private Concessionaire	Dependent. Engage When Needed – Engage in clarification sessions and consult as required.	Transparent communication (RII: 0.836)	- Ensure alignment on project objectives and milestones. - Provide necessary information for their decision-making process.
Financers (Banks/ Investors)	Definitive. Handle Closely – Ensure continuous communication about funding milestones and financial expectations.	Early financial analysis (RII: 0.755)	- Regularly update on financial assessments. - Involve in bid assessment process
SPV (Project Team)	Dominant – Engage to ensure role clarity and project goals alignment.	Early-stage stakeholder mapping (RII: 0.855)	- Establish project timelines and roles clearly. - Define project roles during the bidding process to avoid delays.
DESIGN DEVELOPMENT			
Private Concessionaire	Definitive. Handle Closely – Keep involved in all stages of design to ensure operational feasibility.	Collaborative design reviews (RII: 0.891); Clearly defined roles (RII: 0.855)	- Hold collaborative sessions and form a joint committee for regular interactions.
SPV (Project Team)	Dominant. Handle Closely – Involve in detailed decision-making to ensure proper project execution	Design strategy integration (RII: 0.8); Develop feedback mechanisms and lessons learnt (0.836)	- Regularly review and align stakeholder expectations. - Ensure clarity in roles and responsibilities among stakeholders.
Technical Consultants	Definitive. Handle Closely – Ensure their engagement at every stage for technical validation.	Continuous interaction (RII: 0.891); Design alignment (RII: 0.891)	- Ensure alignment between stakeholders and the design team. - Agreement on brief between stakeholders.
CONSTRUCTION			
Public Entity	Definitive. Handle Closely – Ensure consistent reporting and compliance with policies and guidelines.	Conflict resolution mechanisms (RII: 0.945); Transparent reporting (RII: 0.8)	- Provide updates on construction progress. - Facilitate resolution of conflicts and maintain legal compliance.
Contractor	Definitive. Handle Closely – Ensure they are supported with required resources for timely project execution.	Stakeholder training (RII: 0.78); Transparent and continuous communication (RII: 0.836)	- Ensure transparent communication to address concerns promptly. (effective change management)
TESTING AND COMMISSIONING			
SPV (Project Team)	Definitive. Handle Closely – Ensure smooth transition into the testing and commissioning phases.	Feedback mechanisms (RII: 0.873); Continuous interaction (RII: 0.891)	- Implement structured feedback systems. - Update stakeholders on testing processes and results and align expectations.
Contractors	Definitive. Handle Closely – Ensure they are consistently engaged in the testing and	Testing protocols (RII: 0.818); Transparent reporting (RII:	- Ensure contractors understand testing requirements. - Maintain clear documentation of testing results.

	commissioning process.	0.8)	
OPERATIONS AND MAINTENANCE			
Facility Managers	Definitive. Handle Closely – Establish continuous communication and feedback loops for ongoing support.	Long-term engagement (RII: 0.782); Regular updates (RII: 0.8)	- Set up long-term engagement frameworks. - Provide feedback channels to address operational issues.
Customers/ End-users	Definitive. Handle Closely – Conduct regular surveys, ensure satisfaction, and address any operational concerns	Governance protocols (RII: 0.755); Customer feedback loops	- Create systems for continuous customer feedback. - Implement changes based on feedback for improvement.

The analysis revealed that stakeholders such as public entities, private concessionaires, SPVs, and financiers consistently hold high influence due to their definitive roles in project planning, execution, and operational phases. Conversely, other stakeholders, like local communities, play a more dependent role but are pivotal in ensuring social legitimacy and long-term project sustainability. Furthermore, the study underscored the necessity of tailored engagement strategies and tools at each project phase. For example, regular consultations and compliance checks proved crucial during project initiation and design phases, while robust communication and risk-sharing mechanisms were imperative during construction and operations. The integration of these strategies with stakeholder salience classification facilitated a comprehensive approach to managing complex relationships in PPP projects. By incorporating these findings into the stakeholder management framework, practitioners can proactively address potential conflicts, enhance collaboration, and ensure project success. The chapter lays the groundwork for developing a consolidated set of best practices. These practices aim to streamline stakeholder engagement and contribute to the successful delivery of PPP projects in the Indian construction sector.

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