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Key Factors Influencing Stakeholder Management In Design-Bid-Build Project

Mehar Ali [1,*], Abdul Qadeer [1] , Muhammad Umair Raza [1] and Hanzla Khan [1]

[1] University of Engineering and Technology, Taxila, Pakistan; meharaliali25@gmail.com; abdul.qadeer@uettaxila.edu.pk; engr.m.umair.raza@gmail.com; khanhanzla264@gmail.com
* Correspondence: meharaliali25@gmail.com

Abstract

Stakeholder management is a critical determinant of project success in the construction industry, particularly within the Design-Bid-Build (DBB) framework. Despite its importance, DBB projects often face challenges such as communication gaps, trust deficits, and conflicts among stakeholders, which adversely affect project outcomes. This study investigates key factors influencing stakeholder management in DBB projects across distinct phases, including design, bidding, construction, and project delivery. A comprehensive literature review identified 89 factors, which were refined and validated to 28 factors using the Delphi technique involving a panel of academics and industry experts. The study highlights the most significant factors communication clarity, stakeholder trust, conflict resolution, and proactive engagement and their impact on project phases. By prioritizing these factors, the research provides actionable insights to improve stakeholder collaboration, mitigate conflicts, and enhance project performance. The findings contribute to filling the research gap in stakeholder management within the DBB delivery system and offer practical recommendations for achieving sustainable and successful project outcomes.

Keywords: Stakeholder Management; Construction Industry; Design-Bid-Build (DBB); Construction Stakeholders; Project Performance; Communication Clarity; Conflict Resolution.

1. Introduction

In the economy of developing countries, the construction industry has significant importance, and it plays a vital role in the development strategy for sustained economic growth. Construction is one of the sectors that affects the national capital in two ways, in terms of gross domestic product (GDP) and gross fixed capital formation (GFCF). For developing and developed countries construction is labor intensive and hence plays a crucial role in employment [1]. The significance of industry mainly depends on the project's success and all the activities, mostly the efficiency of the project. Roles and responsibilities are dependent on project delivery methods and also provide a working framework for procurement, design, and construction [2]. They are categorized into traditional (design-bid-build), construction management, and design-build. Each method has pros and cons and is a key factor in achieving project success and objectives. The decision of project delivery method is one of the critical success factors for any construction [2] the reason behind this is its direct impact on the key performance indicators cost, schedule, quality, and safety In traditional

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Design Bid Build, the project progresses in a chronological order of design than bid and leads to construction providing less room for the engagement and collaboration of stakeholders [3]. According to Freeman, the stakeholder in an organization is defined as any group or individual who can affect or affect the achievement of the organization's objective.

In terms of construction, from initiation to deliverables, a larger amount of interest will be affected both positively and negatively. Representatives of these interests are known as project stakeholders. Stakeholders may be external or internal but they come with various needs and concerns and most of the time their concerns and needs are not fulfilled completely [4]. Despite the importance of stakeholders in project success the traditional DBB often leaves room for proper management. Lack of stakeholder management leads to various adverse effects on the project in terms of time, cost, scope, and numerous conflicts between stakeholders that lead to disputes [5]. By identifying key factors affecting stakeholder management and their impact on construction project phases, this research will provide valuable insights for improving project outcomes. This paper aims to explore key factors affecting stakeholders' management in DBB and its impact on each phase (project selection, planning, construction, and operation).

2. Literature Review

Stakeholders play a crucial role in the success of projects across industries, including the construction sector. The term "stakeholders" generally refers to individuals, groups, or organizations interested in, or influencing a project. Freeman [6] defined stakeholders as "any group or individual who can affect or is affected by the achievement of an organization's objectives." In construction projects, stakeholders include many entities, such as project owners, contractors, designers, suppliers, government authorities, end-users, and the local community [7]. Their involvement and influence vary depending on their role and proximity to the project. The construction industry nowadays faces many issues including limited trust, poor collaboration, and poor communication. These problems create conflicts between stakeholders leading to delays, challenges in resolving disputes, increased costs, and legal issues [8].In construction, stakeholders are often classified into two broad categories: internal and external. Internal stakeholders refer to individuals who will directly participate in the project such as project managers, architects, engineers, contractors, and laborers. The external stakeholders, in their turn, are the ones indirectly affected by the project, and they comprise regulatory authorities, local communities, investors, and environmental organizations. The external stakeholders, in their turn, are the ones indirectly affected by the project, and they comprise regulatory authorities, local communities, investors, and environmental organizations. As an example, the project owners or clients set the project goals and provide resources, and the contractors implement the plans within specifications. Architects and engineers are the designers who draw detailed drawings and technical specifications, and regulatory authorities ensure compliance with laws and approved drawings. Lastly, the end-users evaluate the project results, which can and frequently does influence the success of that project by offering comments on functionality and usability [9].

Stakeholders play a crucial role in making sure that construction projects are successful. Active stakeholder involvement is required to make effective decisions, allocate resources, and resolve conflicts. In addition, the involvement of stakeholders will guarantee sustainability of the project and its beneficial contribution to the community as the results of the project are aligned to wider social and environmental demands [10]. The management of stakeholders is also an especially important part of the success of construction projects as it meets the needs, expectations, and interests of different stakeholders in the project. Stakeholder management improves communication, reduces conflict, and facilitates the timely decision-making process, which leads to improved project results [6, 11]. The internal or external stakeholders play a huge role in determining the outcome

of a project. For one to control their impact and expectations, one must assess and communicate clearly [12]. The key stages of this process are to recognize and categorize stakeholders and depend upon professional judgment [13]. Analyzing the roles, contributions, and obligations of stakeholders, it is possible to learn more about their interests and power relations, and that is why coalitions and partnerships contributing to the success of the project become possible [13]. A lot of the current literature is on joint delivery techniques such as Integrated Project Delivery (IPD). This has created a gap in literature that directly deals with the stakeholder management of the Design-Bid-Build (DBB) system [14]. The issue of conflicting interests in DBB contracts and stakeholder involvement has been suggested as a challenge to manage [15]. Nevertheless, the critical examination of the other stakeholder management approaches to DBB projects is still lacking [16].To achieve success in construction projects, stakeholders' involvement plays a crucial role in developing a sustainable environment and mitigates diverse and complex challenges [17]. Several strategies have been proposed to mitigate these challenges, which may be social or economic. A strategy named stakeholder mapping, suggested by the study [10], involves identifying and prioritizing stakeholders based on their needs, concerns, and influences. Another significant strategy that maintains regular communication which act as a solid foundation toward alignment of goals and to address all the needs and concerns of stakeholders, is continuous engagement. A key factor for establishing collaborative relationships is building mutual trust along with transparency and accountability [7]. These effective strategies not only reduce conflicts, but they also play a vital role in enhancing project productivity and sustainability. The need to engage stakeholders in projects is evidenced by project delays, social disagreements, and legal wrangles associated with poor stakeholder management at the Zhuhai-Hong Kong Macao Sea crossing bridge. It is evidenced by many studies that stakeholders should be involved in construction projects and that it may enhance vital measures such as quality, cost, and schedule [6].

The main objective of this paper will be to determine the main factors that influence stakeholder management in Design-Bid-Build (DBB) projects. The research aims to investigate the challenges and dynamics that determine the stakeholder involvement in DBBs contracts, including trust, communication and competing interests, by reviewing the available literature on stakeholder management. These will then be included in a survey as part of the Delphi technique to obtain the opinions of experts, narrow down on the factors, and produce a complete picture of what influences stakeholder management within the DBB framework.

This paper is significant as it aims to improve stakeholder management in Design-Bid-Build (DBB) projects by recognizing the most principal factors based on a literature review and expert opinion through the Delphi method. It addresses a research gap in existing literature, which tends to concentrate on collaborative approaches such as IPD, and provides practical suggestions to improve communication, collaboration, and decision-making. The results will be used to overcome obstacles like trust and delays so that the project can achieve greater success and sustainability.

3. Methodology

This research adopts a multi-phase approach in a systematic manner to detect and rank the issues that affect stakeholder management in the Design-Bid-Build (DBB) projects. It involves a thorough literature review, professional validation using the Delphi technique, and data acquisition with an improved survey tool. The literature review was done comprehensively to elicit factors that affected stakeholder management in DBB projects. Articles, industry reports, and project case studies have been reviewed, and academic sources were identified with an emphasis on issues peculiar to the stages of DBB.

- Design Phase: Collaboration between clients, designers, and regulatory authorities.

- Bidding Phase: Contractor selection, procurement negotiations, and stakeholder influence.
- Construction Phase: Communication management, conflict resolution, and team collaboration.
- Project Delivery and Operation: Project handover, post-construction satisfaction, and long-term stakeholder relationships.

Some of the identified principal factors were the clarity of communication, stakeholder trust, engagement, conflict resolution, and influence. The following were grouped based on their relevance to each DBB phase, developing an initial complete list of evaluations.

3.1. Factors Scoring and Shortlisting

A comprehensive review of past literature identified 89 factors influencing stakeholder management in DBB projects see appendix A1. The frequency of these factors was assessed based on their repetition across studies. Subsequently, the Delphi technique was employed with a panel of experts to refine and validate the factors. Factors with minimal relevance or redundancy were eliminated, retaining only those with high perceived significance for further analysis.

3.2. Survey Development

The 5-point Likert scale was used to design a structured questionnaire to quantify the level of influence of each factor and its stage-specific relevance at each stage of DBB. The survey was reviewed and validated by the Delphi panel to ensure clarity and applicability.

3.3. Delphi- Based Expert Validation

The survey was refined and validated through a two-round Delphi technique:

Round 1: A panel of four experts, comprising one senior academic with extensive research experience and three industry practitioners with over 25 years of professional expertise, reviewed the survey. Their feedback facilitated the consolidation of similar factors, and the elimination of items deemed to have negligible impact.

Round 2: The revised survey was presented for re-evaluation. Consensus was reached on prioritizing factors by their relative importance, resulting in a finalized factor set ready for broader application shown in table 3.

3.4. Data Collection and Statistical Analysis

The validated survey was distributed to construction professionals and academic researchers specializing in DBB projects. The collection of responses is currently in progress. After data collection, descriptive and inferential statistics (mean ranking and factor analysis) would be used to rank the factors in DBB phases.

Table 2 illustrates the demographic and professional characteristics of the Delphi panel, comprising four experts with considerable experience in construction and stakeholder management. The panel included two industry professionals and two academics, ensuring a balanced perspective on the factors influencing stakeholder management in DBB projects.

Table 1: Demographic and Professional Details of Delphi Panel

Attribute		Member 1	Member 2	Member 3	Member 4
Experience		33	33	25	35
Project Type	DB	30			11
	DBB				23
	PPP		26		
Institute type		Semi government	Government		Semi government
Job title		Project director	Director town planning	Professor	Project manager
Highest qualification		PhD	PhD	PhD	M.Sc.

4. Discussion

As a step to narrow down on the initially identified 89 factors, the Delphi technique was used to land on a set of 28 validated factors that affect stakeholder management in Design-Bid-Build (DBB) projects (Table 3). These results reflect the consensus of both academic experts and experienced industry professionals, ensuring reliability and practical relevance. One of the major observations is that the retained factors encompass social, economic, cultural, organizational and technical aspects of project management with a strong emphasis on the multidisciplinary approach of managing stakeholders in a DBB project.

Table 2: Refined Factors Influencing Stakeholder Management in DBB

Sr. No.	Factors
1	Managing project responsibilities and its dynamics (social, economic, ethical, environmental, ecological, political legal and cultural)
2	Mutual trust and respect amongst the stakeholders
3	Clearly formulating project mission and realigning when necessary
4	Favorable procurement method
5	Transparent evaluation of alternatives
6	Flexible project organization and its cultural attributes
7	Identifying and monitoring stakeholder composition change
8	Understanding stakeholder interest and its dynamics
9	Exploring stakeholders' needs and its dynamics
10	Assessing and evaluating project constraints
11	Setting and evaluating stakeholder satisfaction criteria
12	Assessing stakeholder's behavior and managing its dynamics
13	Stakeholder influence assessment and its dynamics
14	Assessing current and changing stakeholder attributes
15	Predicting stakeholder reaction and monitoring its change over time
16	Conflicts resolution and collaborations assessments
17	Formulating, implementing and monitoring stakeholder engagement strategies and strategic change management

18	Ensuring effective communication
19	Stakeholder involvement in decision making
20	Adequate resources and information flow
21	Assessing, maintaining and promoting healthy relationships and analyzing their dynamics
22	Project manager competence
23	Project management team competence
24	Assigning clear roles and responsibilities
25	Adequate uncertainty and risk allocation
26	Obtain support from higher authorities
27	Analyzing socio-political support and its dynamics
28	Analyzing and responding to policy and social value change

The finalized findings affirm that the most significant factors that lead to effective stakeholder management within the DBB projects are stakeholder trust, communication, conflict management, and engagement, as well as managerial competence. These results are in line with other studies that have discussed the importance of clarity in communications and alignment between stakeholders as the factors that determine the success of a project. Nonetheless, in contrast to collaborative delivery models like Integrated Project Delivery (IPD), the inherent limitations of the DBB framework on early stakeholder engagement make all these aspects even more important. The focus on social, political, and cultural aspects further demonstrates that the DBB projects cannot be operated outside of their larger surroundings.

The findings at this point will rely on Delphi expert review. Then, in the second step, the survey tool is to be passed to construction professionals and researchers to gather quantitative data. To rank the factors using statistical analysis (e.g., mean ranking, factor analysis) will be used to prioritize the factors in various DBB phases (design, bidding, construction, and delivery). The future work will give a more focused or phase-based insight into the stakeholder management issues and opportunities in DBB projects.

5. Conclusions

This paper explores and ranks factors affecting stakeholder management in Design-Bid-Build (DBB) projects, a delivery mode that has a unique cycle of design, bidding, building, and project handover. Through a comprehensive literature review and iterative expert validation using the Delphi method, critical factors were identified and assessed for their relevance and impact on project outcomes. The scientific results highlight that effective stakeholder management is mostly driven by communication clarity, the level of stakeholder trust, conflict management, and proactive stakeholder engagement. Focusing on these factors can help the collaboration, reduce conflicts, and perform better on the project. By adopting the prioritization framework presented in this study, project managers and decision-makers can develop tailored strategies to optimize stakeholder relationships and achieve more predictable, successful outcomes in DBB projects. This study will be expanded in the future by gathering survey feedback from industry practitioners and researchers to enable prioritization of such factors at various stages of DBB. This will give a more in-depth, data-driven insight into the issues and opportunities of stakeholder management.

Appendix A

Appendix A.1

Table 3:Identified Factors Influencing Stakeholder Management in DBB Projects: A Literature-Based Analysis

SR.NO	Factor	Frequency
1	Keep satisfied (complying with stakeholder requirements but subject to constraints)	1
2	Complying with cost	6
3	Complying with time	8
4	Complying with quality	7
5	Complying with Service	3
6	Keep stakeholder well informed	9
7	Focusing on the definition of project mission	3
8	Visual techniques	1
9	Forming project coalitions	2
10	No bribe & ignore strategies	1
11	Educate stakeholder	3
12	Mapping stakeholder interests	1
13	Negotiating a compromise between stakeholder	1
14	Forums and open communication interfaces/ medium and authority providing info	5
15	Minimal effort (public relation approach)	1
16	Consult and refine approach	1
17	Obtaining stakeholder feedback	1
18	Resolve differences between or among stakeholders	1
19	Maintaining alignment between stakeholders	1
20	Constantly selling and reselling the project	1
21	Lobby tactics	1
22	Articulating stakeholder interest	1
23	Emphasis on social responsibility	1
24	Changing of all opponents to supporters	1
25	Mitigate/change the project	1
26	Adequately compensate stakeholder	2
27	Contract compliance	2
28	Value of money	5
29	Public participation effectiveness	3
30	Stakeholder Issues	1
31	Competence	1
32	Profitability	3
33	Dispute resolution	1
34	Perception	1
35	Commitment/ Goal commitment	6
36	Expectation	1
37	Environment and safety at work	3
38	Site supervision and subcontracting	1
39	Skill of supplier’s work supervisors	2

40	Coperation	3
41	Relationship quality	1
42	Emergent requirement`	1
43	Involvement	1
44	Project manager's power/ role	2
45	Client's power	1
46	Team conflict	1
47	Experience and performance	1
48	Project nature	1
49	Assigned specificity	1
50	Task conflict	1
51	Specifity requirement	2
52	Concerns	-
53	Adaptability of development to changing needs	9
54	Availability of local job opportunities	8
55	Economic benefits to government and local citizens	10
56	Balanced development of different local economic activities	10
57	Value-for-money of the proposed project(s)	8
58	Access to work and location of activities	11
59	Creation of a safe, convenient, comfortable and legible pedestrian circulation and transport network	9
60	Availability of amenities, community and welfare facilities and provision of public open space	7
61	Being functional and acceptable in terms of tariffs to diversified social groups	7
62	Green and sustainable design and construction	10
63	Prevention and mitigation measures against air, water and noise pollution	7
64	Building design in terms of aesthetics, density, height and visual permeability	7
65	Harmonisation of the proposed project(s) with the local natural setting	8
66	Unique local characteristics	7
67	Conservation of the local cultural and historical heritage	5
68	Compensation and relocation plan/strategy	7
69	Identity of city and international reputation	9
70	Communication	2
71	Team work with other stakeholder	1
72	Project Cost	1
73	Policy and procedures	1
74	Staffing (Turnover and financial)	1
75	Managing expectation	2
76	Contractor issue	2
77	Trust	1
78	Project planning	1
79	Conflicting priorities & urgency	1
80	Politics	1
81	Safety	1
82	Documentation	1

83	Project schedule	1
84	Scope creep and scope	3
85	Satisfying the client / stakeholders	1
86	Too many meetings	1
87	Accuracy in reporting	1
88	Change management	2
89	Chain of command	2

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