

# EXPLORING STAKEHOLDER COLLABORATION IN THE DEVELOPMENT OF BASELINE SCHEDULES

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Effective baseline schedule development is foundational for construction project success, yet its potential is frequently undermined by insufficient stakeholder collaboration, leading to performance inefficiencies and project delays. This research evaluates how stakeholder collaboration influences the process of developing an effective baseline schedule. Specifically, the study seeks to: 1) identify the presence of stakeholder mapping, 2) investigate the extent to which stakeholders are actively engaged, and 3) assess the overall quality of collaboration, and challenges arising, during baseline development. The study includes a literature review and insights from 12 semi-structured interviews conducted with key stakeholders, including project and construction managers, schedulers, clients, and a commercial manager, currently working on Data Centres and Public Works Projects. The findings reveal a lack of formal stakeholder mapping and an unstructured baseline development process with minimal involvement, leading to misaligned schedules, poor onsite coordination, ineffective planning, fragmented client collaboration, and missed milestones, ultimately undermining construction project performance and efficiency. While many studies address stakeholder engagement broadly, this research delves into specific influence on the development process, to advance future collaboration in baseline schedule development.

Keywords: construction planning; organisational culture; productivity; project management; tendering

## INTRODUCTION

“The single biggest problem in communication is the illusion that it has taken place.” (Moss 2018). Construction is a complex, uncertain, and dynamic industry (Gondia *et al.*, 2020), with project failure rates ranging from 56% (Haass and Guzman 2020) to 85% (Gurgun *et al.*, 2024). While delays are often attributed to factors such as material shortages, labour availability, and weather (Durdyev *et al.*, 2017), poor planning remains a leading cause (González *et al.*, 2014). Alsuliman (2019) argues that insufficient stakeholder collaboration during schedule development significantly affects project performance. Though collaboration is in a project’s best interest, stakeholders often fail to integrate effectively, resulting in misaligned schedules and

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coordination issues (Winch 2012). Furthermore, the definition of a stakeholder appears to vary, with Miles (2017) identifying 593 interpretations of the term. While these challenges impact construction broadly, data centre projects face even greater pressures due to their highly compressed timelines and the critical need for rapid delivery to meet increasing global digital infrastructure demands, leaving little room for delays. Similarly, public works projects are experiencing escalating costs and extended delivery timeframes that are garnishing backlash (The Irish Times 2023).

Stakeholders play a significant role in both data centre and public works projects, given the influence the projects play in terms of profitability, social demand and public image. Hence, this research focuses on data centre and building projects under the public works contracts. While previous research has examined project delays and inefficiencies, there remains a gap in understanding the specific mechanisms through which stakeholder collaboration, or the lack thereof, impacts baseline schedule development (Hui Yap *et al.*, 2017). Therefore, this research is a pilot-study as it will look to explore if inconsistencies exist within the available literature (Kistin and Silverstein 2015). Construction typically follows four lifecycle phases: definition, planning, execution, and delivery (Uribe Macías 2017). The baseline schedule, developed during planning, outlines start/finish dates, sequences, and milestones (Vanhoucke 2012), and serves as a benchmark for performance (PMI 2017). Early stakeholder involvement is assumed beneficial, but the extent, structure, and clarity of stakeholder roles remain underexplored (Tampio 2022).

Furthermore, the dynamic and fragmented nature of construction projects introduce further challenges, where multiple stakeholders with varying priorities and risk perceptions must coordinate within constrained timeframes (Mok *et al.*, 2015). As the complexity of projects increase, and the timelines for completion decrease, the focus on a collaborative baseline development is of great significance in the sequencing of activities, determination of resourcing required, and the identification and mitigation of risk through the effective and efficient coordination of a baseline schedule. Understanding the identification and engagement of stakeholders, as well as the degree of collaboration on such projects can provide a first step to enacting strategic practices to improve the process in the construction industry.

To overcome this deficiency, the intricacies of how collaboration occurs on construction projects is explored by the literature review. Secondly, employing a qualitative method, the research employs semi-structured interviews to gain valuable survey data insights from selective industry professionals working in data centre and public works project environments. By integrating insights from the literature review with qualitative interview data, this study explores strategies to foster a more collaborative and stakeholder-driven approach to baseline schedule development. Additionally, an analysis of projects that are compressed in timeline, and of significant social focus, a broader perspective on the diverse challenges and competing priorities within the construction industry is provided. This combined approach enhances the understanding of industry-wide obstacles while emphasising the key factors that influence stakeholder engagement and collaboration, particularly from the perspective of those directly involved in project planning and execution.

Building on these considerations, this study aims to address key research questions regarding how stakeholder collaboration influences baseline schedule development, the extent of stakeholder engagement in the process, and the role of formal stakeholder mapping in improving schedule accuracy and project performance.

Through this investigation, the research contributes to ongoing discussions on enhancing construction planning practices, offering insights that may inform both industry professionals and policymakers seeking to optimise stakeholder involvement in complex project environments.

## LITERATURE REVIEW

### Stakeholder Identification

Strategic Management (SM) is a concept based on the collective theoretical frameworks of corporate social responsibility theory (Wang 2014), organisational theory (Mainardes *et al.*, 2011), social network theory (Lienert *et al.*, 2013), and fairness theory (Phillips 1997), each of which provides a unique and focused perspective on how stakeholder relationships influence decision-making, governance, and long-term value creation. The theories behind SM, while unique in terms of their focus, have a common approach in that to adequately manage stakeholders on a project, it is necessary to identify, analyse, categorise, and implement a strategic plan to engage and influence stakeholders throughout the project's lifecycle (Missonier and Loufrani-Fedida 2014; PMI 2021; Olatunde and Odeyinka 2021). Freeman (2010) emphasizes the importance of separating SM from merely being a project planning exercise, rather it should be considered as an organisational planning tool that aids companies to identify stakeholders of significance that can provide, or aid in, strategic growth. In complex construction environments, such as data centres and public works, stakeholders include client, contractors, regulatory bodies, suppliers, financiers, and local communities, each with varying levels of influence and decision-making authority (Wood *et al.*, 2021).

In public-private partnership (PPP) projects, failure to properly define stakeholder roles and interests early in the process can result in contractual disputes, scope creep, and budget overruns (Eyiah-Botwe *et al.*, 2020). Similarly, in hospital construction projects, managing multiple stakeholders, such as government regulators, medical professionals, and contractors, requires clear identification frameworks to mitigate governance challenges and prevent delays (Tampio *et al.*, 2022). In infrastructure projects, inadequate stakeholder identification can lead to community resistance, environmental disputes, and legal challenges, all of which contribute to disruptions in baseline scheduling (Yu and Leung 2015). Given these risks, a structured and iterative approach to stakeholder identification is necessary to enhance project efficiency and minimise scheduling uncertainties.

The dynamic and evolving nature of stakeholder influence, and indeed the projects themselves, presents an additional challenge in construction projects. Stakeholders who hold significant power at the initiation phase, such as clients and regulatory authorities, may become less involved during the construction phase, where contractors and subcontractors assume greater influence (Zhu *et al.*, 2024). If these shifts in stakeholder roles and priorities are not anticipated, it can lead to fragmented collaboration, misaligned milestones, and ineffective schedule control. As the baseline schedule is being developed, systematically recognising individuals, groups, or organisations that hold a vested interest in the project's success or failure is an important factor. To avoid a scenario where stakeholders have been overlooked or not included in communications, the development of a stakeholder engagement assessment matrix which utilises a responsible, accountable, consulted, or informed (RACI) is encouraged (PMI 2021). However, while existing literature highlights the importance of stakeholder identification, the client, contractor, and project manager

are generally the only identified stakeholders (Gaur *et al.*, 2023), creating an over-simplistic picture (Tampio 2022).

### **Stakeholder Mapping**

Wood *et al.* (2021) indicates that once stakeholders are identified, mapping is required to provide a structured approach to analysing their influence, interest, and impact on the project outcomes, using a model. Bourne and Kasperczyk (2009) notes that although stakeholder mapping has been in existence for quite some time, adoption within the EU has been slow. Wood *et al.* (2021) developed a stakeholder salience framework, which, after initial identification of stakeholders, categorises stakeholders based on three attributes, namely that of power to influence decisions, legitimacy to their rightful involvement, and urgency to demand immediate action, allowing strategies for specific engagement to monitoring to be developed. Uribe Macías (2017) also suggests a structured approach, however, it assess the influence stakeholders have and the potential dependence the project may have on them in short term, and in the long term as there may be potential for change, enabling the establishment of stakeholder specific actions and strategies. Zhu *et al.* (2024) categorises stakeholders as either "key players", including clients, contractors, government, and designers or "minimal effort" to capture the public and industry organisations, an approach that may not evaluate stakeholders based on project type. Eyiah-Botwe *et al.* (2020) indicates the structured approach may be of little use, should the project fail to produce a clear statement of objectives amongst all stakeholders. The dynamic between decision-making and influence can present a challenge to mapping, as stakeholders such as community groups, environmental agencies, and public institutions may at times lack formal decision-making power, however, still exert substantial influence over project outcomes. Infrastructure and urban development projects often face delays due to public opposition, particularly when community concerns are not considered in early scheduling discussions (Eyiah-Botwe *et al.*, 2020). Gaur *et al.* (2023) notes that mapping should be categorised as either power, durability, or legitimacy to determine stakeholder importance.

Despite the availability of structured mapping techniques to positively influence project outcomes (Uribe Macías 2017), formal stakeholder mapping is often neglected, with 30.65% of private construction projects actively implementing a structured stakeholder management process (Olatunde and Odeyinka 2021). In many cases, stakeholder engagement is limited to regulatory compliance rather than a proactive collaboration approach, leading to inadequate input during scheduling phases and increased project risks (Yu and Leung 2015). This lack of structured mapping is particularly problematic in large-scale infrastructure projects, where stakeholder interests evolve over time, requiring continuous reassessment to prevent misalignment with project goals (Gaur *et al.*, 2023).

### **METHOD**

The existing literature review reveals the availability of tools and techniques capable of the identification and management of relevant stakeholders; however, these are not specific to any specific phase of the project lifecycle, nor are they generally employed (Olatunde and Odeyinka 2021). Therefore, this research is conducted as a pilot study as it involves the investigation of inconsistencies between literature sources (Kistin and Silverstein 2015). A qualitative sampling strategy is adopted, and the two construction sectors selected are data centres and public works projects due to their complex planning environments and heightened scrutiny related to performance and

schedule (George 2016; Osei-Appiah *et al.*, 2024). Wood *et al.* (2021) defines client project management representatives and contractors as fundamental stakeholders in any project. More specifically, PMI (2021) outline the contractor project planner, project manager, construction manager, and commercial manager as the key stakeholder roles in the schedule development and management of a project. Shiyab *et al.* (2023) outlines that low response rates remain a key contributor to bias and the overall quality of results, therefore, a convenience sampling strategy was initially utilised using existing industry connections, with snowball sampling naturally employed. The inclusion criteria for participants were those directly involved in baseline development, or those tasked with recovery should the project fall into delay, have experience in data centre or public works projects, willing to participate in the study voluntarily, employed by an Irish firm to retain consistency among practices, and with titles aligning with the definitions of Wood *et al.* (2021), (George 2016; Osei-Appiah *et al.*, 2024), and PMI (2021).

This resulted in 12 in-depth semi-structured interviews to collect 'thick descriptions' (Bell *et al.*, 2022) of the participants' own interpretations of stakeholder collaboration within their respective firms as outlined in Table 1.

*Table 1: Summary of Participants*

| Stakeholder           | Amount | Construction Sector                    | Years Experience | Organisation Type  |
|-----------------------|--------|----------------------------------------|------------------|--------------------|
| Project Managers      | 2      | Data Centres<br>Public Works Contracts | 15-20            | General Contractor |
| Construction Managers | 4      | Data Centres<br>Public Works Contracts | 20-25            | General Contractor |
| Project Schedulers    | 4      | Data Centres<br>Public Works Contracts | 10-15            | General Contractor |
| Project Manager       | 1      | Data Centres<br>Public Works Contracts | 10-20            | Client             |
| Commercial Manager    | 1      | Data Centres                           | 15-20            | General Contractor |

Interview prompts were developed based on key themes in the literature, aligning with the research objectives, and to explore not only whether stakeholders were involved in baseline development, but also how frequently, at what stages, and in what capacity they contributed. The statements evoked in-depth discussions allowing participants to provide insights regarding stakeholder identification, mapping, engagement, also addressing challenges in collaboration, decision-making authority, reporting structures, and strategies for resolving conflicts. The interview questions were presented using Microsoft forms, and the interview was conducted using Microsoft Teams, through the researcher's university account, ensuring secure storage and management of data collection. The questions were tested with members of the training centre prior to distribution. Prior to the interview occurring, participants reviewed and agreed to an informed consent declaration, ensuring participants were aware of the purpose of the research, their rights, and notified all data collected would remain confidential. The interviews were transcribed verbatim, enabling the researcher to familiarise themselves with common themes arising from the data, highlight key points and upload to NVivo 14 before performing coding with an abductive nature, combining both inductive and deductive elements, enabling an iterative and flexible approach as themes aligned or emerged from the analysing process (Page *et al.*, 2024). This approach allowed for open coding of interview transcripts, where categories were not constrained by the initial themes, but rather allowed new insights to emerge during analysis. Inspired by Grounded theory (Glaser and Strauss 1967; Locke 2001) and focusing on the generation of theory from data, the use of open coding was used to group and categorise codes.

## FINDINGS AND DISCUSSION

This study presents findings and subsequent discussion derived from in-depth semi-structured interviews conducted with key stakeholders involved in construction project scheduling, each providing insights into their organisations' stakeholder collaboration practices during baseline schedule development. Interviews were analysed thematically to identify common patterns and experiences among participants.

The findings are summarised in Table 2, where interview participants consistently noted the absence of formal stakeholder identification and mapping processes within their organisations. Stakeholders are often identified informally, based on historical project experience rather than structured frameworks, leading to oversight of key stakeholders such as subcontractors, suppliers, and regulatory bodies. Additionally, formal stakeholder mapping tools are rarely employed, causing ambiguity around stakeholder roles and responsibilities. Stakeholder engagement in baseline schedule development predominantly remains minimal and reactive, with limited early-stage involvement from clients, subcontractors, or suppliers.

*Table 2: Summary of findings*

| Theme                      | Quote                                                       | Description & Example                                                               |
|----------------------------|-------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Stakeholder Identification | "Stakeholders identified informally from past familiarity." | Informal identification frequently omits critical stakeholders.                     |
|                            | "Relies heavily on historical contacts."                    | Assumptions in repeat projects can overlook new stakeholders.                       |
|                            | "Labour unions and inspectors often overlooked."            | Overlooked stakeholders cause compliance and schedule disruptions.                  |
| Stakeholder Mapping        | "Rarely implement formal stakeholder mapping."              | Lack of structured methods leads to ambiguity and reactive engagement.              |
|                            | "No structured classification process."                     | Unclear stakeholder roles reduce management effectiveness.                          |
|                            | "Clients limited to milestones, minimal detailed input."    | Limited client involvement leads to misaligned detailed planning and delays.        |
| Stakeholder Engagement     | "Internally developed schedules sent for approval."         | Internal-only schedule creation misses stakeholder insights.                        |
|                            | "Subcontractor feedback reactive, after issues arise."      | Late subcontractor input results in frequent revisions and missed completion dates. |
|                            | "Fragmented communication; feedback reactive."              | Poor communication results in reactive stakeholder involvement.                     |
| Collaboration Challenges   | "No regular structured meetings."                           | Lack of meetings causes misalignment and poor communication.                        |
|                            | "Conflicting priorities unresolved early."                  | Early-stage conflicts lead to frequent schedule adjustments and delays.             |

The findings provide valuable perspectives on how stakeholder collaboration is currently practiced within industry settings, particularly during the planning and baseline scheduling phases. By incorporating thematic interview prompts and abductive coding to examine recurring themes across participant responses, the discussion highlights underlying issues affecting stakeholder collaboration, from which stakeholder identification, mapping, and engagement were identified as the emerging themes.

### Stakeholder Identification

All (12) of the participants confirmed their organisation does not have a formal or structured stakeholder identification process, noting the clients and contractor project

managers were generally the assumed stakeholders, with no considerations of subcontractors, suppliers, or external regulatory bodies "Stakeholders are generally identified informally from past familiarity on projects". The failure to systematically identify all influential stakeholders contradicts Wood *et al.* (2021), emphasising the importance of stakeholder identification resulting in construction gaps (Gaur *et al.*, 2023; Tampio 2022).

### **Stakeholder Mapping**

Despite the availability of structured stakeholder mapping (Bourne and Kasperczyk 2009; Olanrewaju and Ogunlana 2021), the project managers (3), construction managers (4), and project schedulers (4) state that these techniques are not adopted in practice, "No structured classification process is utilised". Theoretical models such as the Stakeholder Salience Model (Wood *et al.*, 2021), Power-Interest Matrix (Zhu 2024), and RACI framework (PMI 2017) offer clear methodologies for categorising stakeholders based on power, legitimacy, and urgency, prior and during the planning stages of a project, a sentiment echoed by the project (3) and construction managers (4), however, there was little consensus on who should be responsible for implementing it. Those in scheduling (4) and construction management roles (4) indicated that mapping fell outside their remit, while project managers (3) and the commercial manager (1) assumed that stakeholder identification was a general and informal project function rather than a structured process. Project managers (4) also noted that stakeholder engagement was largely reactive, with certain stakeholders requesting updates or involvement only after project execution had begun, reinforcing that stakeholders are not thoroughly identified, mapped, or engaged, nor do they appear to attempt to engage themselves, facilitating unclear communication channels and undefined responsibilities contributing to misalignment (Tampio 2022; Zhu *et al.*, 2024).

### **Stakeholder Engagement in Baseline Scheduling**

Schedulers (4) indicated that stakeholder engagement in baseline development is often restricted to high-level milestone approval, with little interaction on the sequencing, resourcing, or confirmation of scope alignment, and not an active collaboration between clients, contractors, subcontractors, and other stakeholders (PMI 2021; Zhu *et al.*, 2024). The general contractor project managers (2), construction managers (4), and commercial manager (1) were unsure as to the level of engagement clients were involved, with each noting stakeholder engagement is typically driven by necessity rather than proactive planning. The schedulers (4) noted that the baseline is developed in silo, excluding key stakeholders from early planning discussions, despite the potential to improve scheduling accuracy by collaboratively determining resourcing availability and execution constraints, often resulting in the failure to achieve activity and milestone completion dates (Olatunde and Odeyinka 2021; and Tampio 2022). The absence of early, proactive engagement results in misaligned assumptions, inefficiencies in work execution, and the need for frequent schedule revisions. Several participants did allude to time constraints (schedulers 4), resource limitations (construction managers 4), and concerns over commercially sensitive information (commercial manager 1) being shown to certain stakeholders as some of the reasons to not adopting a structured approach to stakeholder management, however, it was also noted by the schedulers (4), construction managers (4), and commercial manager (1) that they were unsure who should identify the stakeholders. This would indicate there exists systemic issues around stakeholder management rather than simply the

misunderstanding of the approach. Moreover, there is a clear lack of awareness and existence of collaboration mandates and processes within the organisational structure.

### **Collaboration Challenges**

Mok *et al.* (2015) and Zhu *et al.* (2024) state that stakeholders generally interact with the schedule when the project experiences delays, conflicts, or contract enforcement issues arise, with the schedule being built in isolation rather than progressive collaboration, a sentiment echoed by all participants (12). Participants in public works projects, project managers (2), construction managers (2), and schedulers (2), noted that feedback from clients and external stakeholders was primarily focused on verifying milestone dates, rather than contributing to schedule development itself, reducing opportunities for iterative schedule improvements, aligning with the previous studies by Eyiah-Botwe *et al.* (2020) and Olanrewaju and Ogunlana (2021). Without a structured collaboration framework, projects will likely continue to rely on reactive problem-solving rather than proactive stakeholder alignment, reinforcing inefficiencies and leading to frequent schedule adjustments and misaligned priorities.

The findings indicate a persistent gap between theoretical best practices in stakeholder management and their practical application in baseline schedule development. The reliance on repetitive, experience-based identification in familiar project environments may be efficient in the short term but becomes problematic when projects expand into new locations or involve new clients, where compliance and regulatory issues can arise unexpectedly (Yu and Leung 2015). While frameworks and methodologies for stakeholder management exist, they are rarely adopted or adaptable to many live project environments, particularly during baseline scheduling.

### **CONCLUSION**

Construction projects frequently suffer from delays and misaligned schedules due to a lack of structured and adaptable stakeholder collaboration during baseline schedule development. This study explored how stakeholder collaboration influences the creation of baseline schedules, focusing on stakeholder identification, mapping, engagement, and collaboration quality. Using a qualitative approach, the research combined a literature review with 12 semi-structured interviews involving professionals from data centre and public works projects. The findings reveal that stakeholder management is often informal and reactive. Stakeholders are commonly identified through past projects rather than formal mapping, and their engagement is typically limited to milestone review rather than meaningful participation in schedule development. These findings indicate a significant gap between best-practice frameworks and real-world application. There is a need for project teams to adopt more structured and proactive collaboration strategies. Integrating stakeholder engagement frameworks into standard planning procedures could lead to more realistic schedules, stronger alignment, and improved project performance.

As a pilot study, this research provides a foundation for further work. Future studies could explore the implementation and effectiveness of specific stakeholder management tools across diverse project types and delivery environments.

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