01-031 – Stakeholder management in construction: collaborative tools in hybrid project management – Gestión de interesados en construcción: herramientas colaborativas en proyectos con enfoque híbrido

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Stakeholder management in construction projects with a hybrid approach poses challenges arising from the coexistence of predictive and Agile methodologies. This presentation proposes a model that integrates language patterns inspired by Christopher Alexander with collaborative tools and adaptive strategies to enhance effective stakeholder participation in construction environments. Collaborative tools reinforce communication, cohesion, and alignment of expectations among teams and stakeholders. Digital collaborative platforms enable agile and transparent change management, simplifying decision-making at each project stage. The research is grounded in analyzing a real case of a sustainable urban project, where communication barriers and success factors in stakeholder coordination were identified. Within this framework, pilots were conducted with multidisciplinary teams to examine the effects of hybrid methodologies on key indicators of efficiency and satisfaction. The findings reveal improvements in collaboration and clarity of responsibilities. This innovative approach provides a robust basis for formulating replicable strategies in different contexts, fostering more dynamic and participatory construction projects.

Keywords: *Stakeholder management; Hybrid project management; Collaborative tools; Construction projects; Pattern language*

La gestión de interesados en proyectos de construcción con enfoque híbrido presenta desafíos derivados de la convivencia de metodologías predictivas y ágiles. Esta ponencia propone un modelo que integra patrones de lenguaje inspirados en Christopher Alexander con herramientas colaborativas y estrategias adaptativas, orientado a la participación efectiva de los *stakeholders* en entornos de construcción. Mediante la aplicación de herramientas colaborativas, se promueve la comunicación, cohesión, y la alineación de expectativas entre equipos y partes interesadas. A su vez, las herramientas colaborativas digitales permiten gestionar cambios de manera ágil y transparente, simplificando la toma de decisiones en cada fase del proyecto. La investigación se basa en el análisis de un caso de estudio de proyecto urbano sostenible, donde se identifican barreras comunicacionales y factores de éxito en la coordinación de interesados. En este marco, se llevaron a cabo pilotos con equipos multidisciplinares para examinar los efectos de las metodologías híbridas en indicadores clave de eficiencia y satisfacción. Los resultados muestran una mejora en la colaboración y en la claridad de responsabilidades. Este enfoque innovador proporciona una base sólida para la formulación de estrategias replicables en diferentes contextos, impulsando proyectos de construcción más dinámicos y participativos.

Palabras claves: *Gestión de interesados; Proyectos híbridos; Herramientas colaborativas; Proyectos construcción; Patrones de lenguaje*

1. Introduction

Successful construction project delivery depends significantly on proactive stakeholder management. Stakeholders—clients, end-users, community members, and project teams—exert substantial influence over project outcomes, making their effective engagement crucial (Project Management Institute [PMI], 2024). Research consistently shows projects with active stakeholder involvement have markedly higher success rates, as ineffective stakeholder management frequently results in scope changes, delays, and even project failure (Fernandes et al., 2018; Gemino et al., 2021). Consequently, contemporary project management emphasizes collaborative practices to integrate stakeholders effectively throughout the project lifecycle.

Concurrently, the project management field has experienced a methodological paradigm shift. Traditional "waterfall" methods, characterized by detailed upfront planning and sequential phases, have dominated the construction industry due to their predictability and structure. Yet, their rigidity poses challenges in managing complexity and uncertainty (Kerzner, 2022). In contrast, agile methods prioritize flexibility, iterative processes, and continuous stakeholder collaboration, enabling rapid adaptation to changing conditions (Highsmith, 2019). The last decade has witnessed rising interest in Hybrid Project Management (Hybrid PM), which combines the structured planning and control of traditional approaches with the flexibility and responsiveness of agile methods. Surveys from PMI indicate that hybrid approaches increased from about 20% of projects in 2020 to over 30% in 2023, reflecting a shift toward methodologies tailored to specific project contexts (PMI, 2024).

The rationale for adopting Hybrid PM in construction is compelling. Lalmi, Fernandes, and Boudemagh (2022) demonstrate that hybrid methodologies effectively balance structure required for regulatory compliance and safety with the adaptability needed for stakeholder engagement and rapid response to unforeseen events. Gemino, Reich, and Serrador (2021) further confirm that hybrid approaches yield comparable schedule, budget, and scope performance to traditional methods, while significantly enhancing stakeholder satisfaction.

Hybrid PM integrates agile and lean collaborative tools—such as Scrum-based iterative reviews, Kanban visual management, and Lean construction techniques—enabling improved transparency, communication, and efficiency (Fernandes et al., 2018). Christopher Alexander’s seminal work on Pattern Language (Alexander et al., 1977; Alexander, 2002) underscores the significance of shared languages and structured collaborative interaction patterns, which support clarity and mutual understanding among diverse stakeholders, enhancing participation and project coherence.

Despite its potential, Hybrid PM application in construction remains an evolving field. Recent research, including studies by Paul (2023), suggests advanced technologies such as artificial intelligence could further strengthen hybrid frameworks, enhancing predictive capabilities and stakeholder communication.

This paper contributes to the literature by presenting an empirical case study: the development of Salitre Park, a multidisciplinary urban project in Ecuador. Chosen for its complexity and community impact, this case illustrates the practical integration of hybrid practices and stakeholder-centric strategies within a traditionally predictive domain. Specifically, this study evaluates whether a hybrid approach employing collaborative tools significantly enhances stakeholder engagement and effectively manages traditional performance metrics such as time, cost, and quality.

Following this introduction, a focused Literature Review contextualizes the current research within recent Hybrid PM and stakeholder management studies. The subsequent Methodology outlines the research design, data collection, and analysis methods. Results from the Salitre Park case are presented next, followed by a Discussion section interpreting the findings against existing literature. Finally, the Conclusion summarizes contributions and limitations, offering recommendations for practitioners and future research.

2. Literature Review

2.1 Hybrid Project Management: Concepts and Adoption

Hybrid project management (Hybrid PM) refers to the tailored combination of traditional (predictive) and agile (adaptive) project management elements within a single project or organizational approach. Rather than adhering strictly to a single methodology, hybrid approaches borrow and integrate practices from multiple frameworks to suit the project's specific needs. Early discussions of Hybrid PM often framed it as mixing agile techniques into the linear structure of waterfall projects, effectively seeking a balance between rigor and flexibility. Špundak (2014) describes hybrid methods as emerging from the desire to capture agile benefits (responsiveness, customer collaboration) without abandoning the stability of traditional approaches. In practical terms, this might mean a project uses a detailed master schedule and critical path (traditional) but executes work in short iterations with frequent client feedback (agile), and continuously refines processes to eliminate waste (lean).

The adoption of hybrid methodologies has accelerated in recent years across industries. Several surveys indicate that Hybrid PM is becoming commonplace. For instance, a PMI study reported that over half of the 477 projects analyzed employed hybrid practices, whereas purely agile and purely traditional approaches were less common. More broadly, PMI's Pulse of the Profession data show a strong upward trend in hybrid usage worldwide, with many organizations moving away from a dichotomy of "agile vs. waterfall" toward a continuum of blended approaches (PMI, 2024). This shift is driven by the recognition that no one methodology is universally best – complex projects often benefit from the structure of traditional PM and the adaptability of agile. Hybrid methods allow customization: teams can leverage familiar processes such as stage-gate reviews, detailed budgeting, and risk management from the predictive side, while also incorporating time-boxed development cycles, continuous stakeholder input, and iterative planning from the adaptive side. This flexibility is particularly valuable in construction projects, which typically have fixed endpoints and compliance requirements but can face evolving stakeholder demands or unexpected site conditions.

Empirical research supports the value of Hybrid PM. Gemino et al. (2021) show that hybrid projects perform as well as traditional ones in cost, time, and scope, while significantly improving stakeholder satisfaction. Fernandes et al. (2018) emphasize that hybridization enhances performance when aligned with project context and collaborative environments. Lalmi et al. (2021, 2022) propose a triadic Hybrid PM model—Traditional, Agile, and Lean—arguing this synergy improves customer satisfaction and mitigates common construction risks such as delays and overruns.

Recent work by Paul (2023) explores the role of advanced technologies in Hybrid PM. His findings indicate that digital tools and AI-driven platforms further optimize decision-making and stakeholder alignment in hybrid environments. These insights validate the need to rethink traditional management models in construction, especially where stakeholder dynamics and complexity are high.

2.2 Stakeholder Management and Pattern-Based Engagement

Stakeholder management is a foundational aspect of project management, with roots in stakeholder theory (Freeman, 1984) which posits that project success is determined by satisfying the needs of all parties affected by the project. In construction, stakeholders include not only the client/owner and contractors, but also regulatory bodies, local communities, end-users of the facility, and often financial institutions. Each brings unique expectations and can impact project decisions. Effective stakeholder management involves identifying stakeholders, understanding their interests and influence, and developing engagement strategies to ensure their needs are addressed and their influence is guided positively. Research consistently links robust stakeholder engagement to improved project outcomes. For example, PMI's 2017 survey noted that most successful projects had actively supportive sponsors (an internal stakeholder), underlining the role of stakeholder buy-in in achieving project goals. Beyond top-level sponsors, the engagement of end-users and communities is crucial, especially in public infrastructure projects. When stakeholders are not adequately consulted, projects can face resistance, scope changes, or lack of utilization upon completion – all indicators of failure despite technical completion.

Agile frameworks inherently support ongoing stakeholder participation. Scrum, for example, operationalizes this through roles like Product Owner and events like sprint reviews (Schmitz et al., 2018). Translating these practices into construction entails moving from milestone-based consultations to continuous stakeholder involvement via workshops, walkthroughs, and feedback sessions.

Effective stakeholder communication in projects has even been connected to theories from outside the traditional PM domain. An interesting perspective comes from the work of Christopher Alexander on pattern language in architecture. Alexander's theory, originally formulated for designing living spaces, emphasizes the importance of shared language and patterns in collaborative design. Applied to project management, it suggests that teams and stakeholders benefit from a common understanding of processes and terms – essentially a shared "project language". For instance, if all parties use consistent terminology for project stages, deliverables, and change requests, it reduces confusion and conflict. Moreover, Alexander's approach defines patterns in terms of context, problem, solution, and consequences. Project managers can mirror this by clearly communicating the context and rationale of decisions to stakeholders (not just the decisions themselves), which increases buy-in and trust. While Alexander's work (Alexander et al., 1977) was not about project management per se, its influence is seen in modern stakeholder engagement strategies that strive for transparency and common understanding. The Salitre Park case later in this paper exemplifies this: the project team created a shared vocabulary and visual communication tools so that local community members (who had no technical background in project management) could actively participate in planning discussions. This approach helped align community expectations with project plans, thereby reducing friction and enhancing stakeholder satisfaction.

In sum, the literature underscores that stakeholder engagement is not a peripheral activity but central to project success. The hybridization of project management offers new avenues to strengthen this engagement: by embedding stakeholder interactions into the project's working processes (via agile/lean practices), teams can proactively manage expectations and incorporate feedback, leading to outcomes that stakeholders deem successful. Stakeholder impact on success has moved from anecdotal understanding to a quantifiable factor in project management research, with methodologies like Hybrid PM providing practical means to maximize positive stakeholder involvement.

2.3 Collaborative Tools and Techniques in Hybrid Environments

The implementation of hybrid project management is greatly facilitated by various tools and techniques that operationalize collaboration and adaptability. On the **process** side, frameworks like Scrum, Kanban, and Lean Construction provide structured methods to involve stakeholders and improve workflow:

- **Scrum Framework:** Introduces roles (Scrum Master, Product Owner, Team) and events (sprint planning, daily stand-ups, sprint review and retrospective) that create regular interaction points. In a hybrid setting, Scrum can be layered onto portions of a project to manage complex tasks or areas of uncertainty. Fernandes et al. (2018) report that incorporating iterative cycles in traditionally plan-driven projects increased communication effectiveness among university-industry project stakeholders.
- **Kanban Boards:** Stakeholders (e.g., client representatives or subcontractors) can be given access to the board, enhancing transparency. The visual nature of Kanban has been praised for aligning multi-disciplinary teams and highlighting process bottlenecks early, enabling preemptive corrective actions (Ozorhon et al., 2022).
- **Lean Construction Techniques:** Lean methods such as the Last Planner System (LPS) emphasize collaborative planning at the crew level and reliable promising (commitments) of tasks. LPS meetings bring together contractors, subcontractors, and sometimes client representatives to plan upcoming work in detail, identify constraints, and ensure tasks are ready to be executed (shielding production from uncertainties). This collaborative scheduling improves coordination and buy-in, as each stakeholder has a voice in setting the plan and is more likely to honor it. Lean also encourages continuous improvement by systematically removing sources of waste (materials waste, waiting time, rework, etc.), lean practices contribute to cost savings and schedule improvements. For instance, Ballard (2000) showed that projects implementing LPS saw schedule predictability significantly improve. In our case study, lean principles were applied in the form of value stream mapping to optimize procurement and on-site workflows, which helped mitigate earlier delays caused by material shortages.

Technology platforms—such as Asana, Trello, or Microsoft Project Online—consolidate agile and traditional views, enabling hybrid teams to manage backlogs, dependencies, and timelines simultaneously. In Salitre Park, cloud-based tools ensured transparency among municipal teams and community members, allowing near-real-time updates and feedback.

Emerging technologies like AI and analytics are set to further transform stakeholder engagement in Hybrid PM. Paul (2023) highlights how AI can predict delays, automate communication, and analyze public sentiment—tools that could mitigate risks and refine project decisions in data-rich environments.

In summary, a range of collaborative tools and techniques exist to operationalize hybrid project management. The literature suggests that when these tools are thoughtfully integrated, they can improve both process efficiency and stakeholder satisfaction. The case study in the next sections will illustrate how a selection of these practices was applied in a real project. It will also provide concrete evidence of the benefits and challenges observed, thereby grounding the theoretical expectations from this literature review in practical outcomes.

3. Methodology

3.1 Research Design

This study employed a qualitative case study methodology with an embedded action-research approach, focusing on the Salitre Park Project, a municipal construction initiative in Ecuador,

as a pilot for hybrid project management practices. The single-case design was selected due to its unique potential to examine hybrid practices in detail within a real-world setting, following Yin's revelatory case criteria. The study covered the entire project lifecycle, documenting stakeholder interactions and performance outcomes under the hybrid approach.

Data were triangulated from multiple sources: project documentation (including charters, baseline and agile sprint plans, meeting minutes, and progress reports), participant observation (with researchers embedded in team activities such as Scrum meetings and stakeholder sessions), and semi-structured interviews at mid-project and completion phases with stakeholders (project manager, municipal sponsors, contractors, and community delegates). Performance data were quantitatively tracked through Earned Value Management (EVM) techniques, focusing on Schedule Performance Index (SPI), Cost Performance Index (CPI), and stakeholder engagement metrics. Qualitative data from interviews and observations were coded thematically to identify patterns related to stakeholder interactions and hybrid management impacts.

3.2 Case Study Context: The Salitre Park Project

The case study is set in the canton of Salitre, in Guayas province of Ecuador. The project entailed the construction of a multidisciplinary urban park in the Juan Montalvo sector of Salitre. This park was envisioned as a sustainable public space incorporating recreational areas, green landscaping, and community facilities. The initiative responded to a local development plan aiming to improve urban infrastructure and inclusivity. The project stakeholders were diverse: the municipality of Salitre (project owner and funder), urban planners and architects (design team), construction contractors, local community residents (as end-users and beneficiaries), and environmental consultants (to advise on sustainability features).

From the outset, the project team recognized that community buy-in would be critical, given the park's direct impact on residents. The project's success criteria thus extended beyond the iron triangle of scope, time, and cost – they included delivering social value and achieving community satisfaction. However, initial assessments revealed gaps in how the project was planned to meet these criteria. During the diagnosis phase, prior to adopting the hybrid model, several deficiencies were identified in the conventional plan: (1) Stakeholder engagement was insufficient – the original plan had minimal provisions for public consultation, risking misalignment with community needs. (2) Sustainability considerations were weak – criteria for environmental design (e.g., native plant selection, flood management) were not well integrated into scope and WBS. (3) The risk management plan did not fully anticipate supply chain issues; indeed, early execution encountered delays in material procurement that were not mitigated, causing schedule slippage and budget pressure in the initial months. These issues manifested as a slip in the planned schedule and growing concern from community members who felt they were not informed or involved in the project's development.

In response to these challenges, the project leadership (which included a PMP-certified municipal project manager and two academic advisors from a local university) decided to implement a corrective strategy using a hybrid project management model. The goal was to introduce more adaptability and stakeholder involvement without discarding the essential planning already done. The hybrid approach was structured as follows:

- The team maintained the **master schedule** and **budget** as high-level controlling artifacts (a traditional element), but moved to a rolling-wave planning approach for detailed tasks. The master schedule had milestone phases (design, site preparation, construction, finishing), but within each phase, detailed planning was done iteratively.
- A **Scrum-inspired cadence** was adopted. Bi-weekly sprint planning meetings were introduced, where the contractor's site manager, the municipal project manager, and

stakeholder representatives would review progress and prioritize tasks for the next sprint. Daily stand-up meetings were held on-site each morning with the construction team and were open to the project manager and any stakeholder representatives who wished to attend. This created a regular feedback loop. Notably, two community delegates (residents appointed by the local neighborhood committee) were invited to attend sprint reviews at the end of each iteration, where the team demonstrated what had been accomplished (for instance, showing the completed playground foundation or newly planted trees) and gathered feedback or concerns from the community perspective.

- A **Kanban board** was implemented in the project office to track work-in-progress for critical work streams (e.g., civil works, landscaping, facilities/equipment installation). The Kanban system proved especially useful in highlighting external constraints: during one sprint, several tasks (related to installing solar lighting) got stuck in "Pending" due to delayed shipment of materials. Seeing this, the team took action by re-sequencing some activities (they pulled forward tasks in landscaping while waiting for the solar equipment) and the procurement team sought alternate suppliers – a level of agility enabled by the transparent workflow visualization.
- **Lean practices,** notably value stream mapping and the Last Planner System (LPS), were employed to improve coordination, predictability, and efficiency by identifying non-value-added activities and enabling weekly task commitments.
- **Community engagement** was conducted through structured, interactive workshops allowing stakeholders to provide direct design inputs, such as incorporating an open-air amphitheater suggested by community members.
- A **cloud-based project management tool** (Microsoft Teams with Planner, in this case) was used to share key project information. The project schedule (in MS Project) was published to this platform so that stakeholders like the municipal officials and community delegates had read-only access to see high-level timelines and task status. Documents such as environmental impact assessments, weekly progress reports, and minutes of meetings were all shared in a common folder accessible to stakeholders.

Through these hybrid practices, the project aimed to "ensure greater flexibility in project management without compromising planning and cost control". Importantly, the hybrid model was not implemented all at once, but gradually and adaptively. The team continuously refined the approach. They also responded to stakeholder feedback about meeting frequency – community delegates found bi-weekly reviews too frequent at times (given they had other jobs), so the team made their attendance optional except when key decisions were needed and provided summary updates through the online tool instead. This adaptive management of the process itself is a hallmark of action-research, where interventions are adjusted based on ongoing evaluation.

4. Results

4.1 Project Performance Outcomes

The implementation of the hybrid model in the Salitre Park Project resulted in notable improvements in both stakeholder-related outcomes and classic project performance indicators. Table 1 summarizes the key performance metrics compared to initial project plans:

Table 1: Key Performance Metrics: Planned vs. Actual Outcomes for Salitre Project.

Performance Indicator	Planned (Baseline)	Actual (Outcome)
Project Duration	12 months (Jan–Dec 2024)	12.5 months (2-week delay)
Project Cost	$1,000,000 USD (budgeted)	$1,040,000 USD (approx. +4%)
Schedule Performance Index (SPI)	1.00 (on schedule)	0.96 (slightly behind schedule)
Cost Performance Index (CPI)	1.00 (on budget)	0.98 (slightly over budget)
Community Meetings Held	5 (during project lifecycle)	8 (including 3 design workshops)
Community Participation	50 participants expected (total)	120+ participants (over project)
Stakeholder Satisfaction	80% (target satisfaction rating)	92% (actual satisfaction rating)

(Note: Satisfaction was measured via a post-project survey of key stakeholders, scoring satisfaction with process and outcomes.)

As shown in Table 1, **the project was delivered essentially on time and within budget**, with only minor deviations. The baseline schedule anticipated project completion by end of December 2024; actual substantial completion was achieved in mid-January 2025. This roughly 2-week delay (about 4% slippage) was primarily due to early procurement delays. However, after the hybrid measures were introduced (around April 2024), the team was able to mitigate further delays, and in some later phases actually recuperated lost time through concurrent scheduling of tasks (enabled by agile re-planning). The final Schedule Performance Index (SPI) of 0.96 reflects this slight delay but indicates that schedule performance was very close to plan. On the cost side, the project had a modest budget overrun of approximately $40,000 (4% over the $1 million budget). The Cost Performance Index (CPI) of 0.98 at completion signifies that costs were almost on budget. Notably, this small overrun was largely attributable to scope enhancements that were approved (such as the amphitheater and additional landscaping requested by stakeholders). When accounting for these approved changes, the project stayed within its adjusted budget. In fact, **no contingency funds** were needed beyond what was already allocated, and the cost increase was covered by reallocation of savings from waste reduction (lean practices reduced material waste expenses, which offset some added features).

Crucially, **stakeholder engagement metrics surpassed expectations** with community participation more than doubling the initial estimate. A total of eight meetings—including interactive design sessions—were held, attracting over 120 participants. High levels of stakeholder involvement contributed directly to the 92% satisfaction rating recorded at project completion, greatly exceeding the targeted 80%. Community respondents emphasized transparency, responsiveness to feedback, and tangible project impacts aligning closely with their expressed needs.

From a **quality and scope** perspective, the project achieved its intended benefits with few compromises. Incorporation of stakeholder-driven scope enhancements occurred without substantial negative impacts on budget or schedule due to agile iterative planning and lean waste reduction practices. Minor scope changes were enhancements rather than corrective actions, reflecting proactive stakeholder integration.

The performance data underscores that the hybrid approach succeeded in **maintaining control over schedule and cost**, while dramatically boosting stakeholder engagement and satisfaction. The modest schedule delay can be viewed in light of the initial issues encountered;

given the early delays and added scope, a 4% overrun in time is relatively small and indicates effective recovery. Likewise, a 4% cost overrun (with value-adding changes) is within typical project variance and reflects effective budget management. In short, the project met its hard objectives (delivery within acceptable time/cost limits) and excelled in its soft objectives (stakeholder buy-in, social impact).

4.2 Qualitative Insights and Stakeholder Feedback

Beyond the numbers, qualitative observations provide insight into how the hybrid practices influenced these outcomes:

- **Improved Communication and Trust**: Stakeholders consistently reported improved communication and transparency, citing regular meetings and clear, accessible documentation facilitated by the Kanban board and digital collaboration tools (Microsoft Teams). These practices significantly enhanced stakeholder trust, as evidenced by comments describing interactions as "open and honest" and appreciation for the project team's proactive responsiveness to concerns.
- **Flexibility in Managing Changes**: Stakeholders emphasized the project's ability to incorporate community-driven suggestions, such as the amphitheater addition, swiftly and efficiently, without substantial disruption to the overall schedule or budget. This agile responsiveness helped avoid costly late-stage rework and contributed directly to heightened community satisfaction.
- **Risk mitigation** and proactive problem-solving were notably enhanced. The transparent workflow visualization enabled rapid identification and resolution of bottlenecks, exemplified by quick mitigation of procurement delays for solar lighting. Regular reviews and stand-up meetings facilitated real-time identification of risks and immediate corrective actions, improving project reliability and adherence to schedules.
- **Team Morale and Stakeholder Ownership**: The hybrid approach positively influenced team morale and stakeholder ownership. Team members reported feeling more empowered, with active involvement in planning and decision-making processes, enhancing their motivation and productivity. Community participants experienced a strong sense of ownership, leading to voluntary additional contributions, such as organizing preparatory park clean-up activities, reinforcing community pride and project success.
- **Challenges Encountered:** Challenges encountered included initial resistance and confusion from team members unfamiliar with hybrid practices. These were effectively addressed through targeted training sessions, continuous coaching, and structured governance practices ensuring clear documentation and traceability of decisions. Additionally, potential scope creep from extensive stakeholder feedback was carefully managed through disciplined evaluation processes, balancing responsiveness with rigorous control over project scope and budget constraints.

In summary, the qualitative evidence portrays a project environment that became more **adaptive, transparent, and inclusive** thanks to hybrid management interventions. Stakeholders not only felt more engaged; their engagement directly contributed to better project decisions and outcomes. The team managed to navigate the tension between flexibility and control: even as they embraced changes and iterative planning, they kept a firm handle on baseline objectives and performance tracking. The success of the Salitre Park Project thus provides a concrete demonstration of the advantages posited by hybrid project management theorists. In the following section, a broader discussion links these findings considering existing literature and articulate the broader implications for project management practice.

5. Discussion

The outcomes of the Salitre Park Project case offer several insights that enrich our understanding of hybrid project management and stakeholder management in construction. Broadly, the case validates many of the theoretical expectations from literature, while also highlighting practical considerations for implementation.

5.1 Hybrid Approach and Project Performance

One of the most significant findings is that the hybrid approach achieved *comparable schedule and cost performance* to what would be expected under a well-executed traditional approach, even though the project encountered difficulties that often derail traditional projects. Despite early delays and added scope, the project was completed only slightly behind schedule and within a few percentage points of the budget. This aligns with Gemino *et al.* (2021), who found that hybrid projects can deliver similar budget/schedule outcomes as traditional ones. In our case, the flexibility of the hybrid model was instrumental in recovering from issues (e.g., re-sequencing work when materials were delayed) that might have caused major overruns in a rigid plan. The ability to continually re-plan and optimize the schedule in short cycles meant the team could adapt to reality on the ground. Traditional methodology might have treated the baseline as fixed, resulting in accumulating variance; in contrast, the hybrid approach treated the baseline more dynamically, which helped keep the project on track. Importantly, this adaptability did not come at the expense of cost control – change control procedures and lean cost-saving measures (like waste reduction) helped balance the budget impacts. This reinforces that hybrid methods, when properly managed, are not a “chaotic free-for-all” as some skeptics fear, but rather a disciplined integration of change-tolerance within a control framework. It suggests that organizations can confidently adopt hybrid practices to handle complexity without losing governance over project finances and timelines.

5.2 Stakeholder Engagement and Satisfaction:

The significant improvements in stakeholder engagement confirm the theoretical expectations that stakeholder-centric methodologies inherently enhance project acceptance and satisfaction. By actively involving stakeholders and transparently incorporating their feedback into decision-making, the Salitre Park Project fostered trust and collective ownership, reinforcing stakeholder engagement frameworks and Alexander’s concept of shared language.

This resonates with the findings of Gemino *et al.* (2021) that stakeholder success is significantly improved in hybrid (and agile) projects. When stakeholders are actively involved and see their input shaping the project, they are more likely to view the outcome as successful, even if minor shortfalls occur. In Salitre Park, for example, the community was forgiving of a slight schedule delay because they were part of the journey and saw it as a collective effort. This confirms a key benefit often claimed for agile/hybrid approaches: higher stakeholder buy-in. It also echoes broader project management wisdom that stakeholder expectations, if well managed, can make the difference between a project being judged a success or failure regardless of objective metrics.

5.3 Integration of Agile and Lean in Construction:

The successful use of Scrum-like sprints and lean techniques in this case provides a data point for the ongoing discourse on agile/lean integration in construction. Past research (e.g., *AgiLean* by Demir et al., 2013) has suggested that combining agile and lean can address both flexibility and efficiency in construction projects. Our case showed that a tri-modal hybrid (traditional-agile-lean) is not only feasible but mutually reinforcing: agile practices brought flexibility and stakeholder input; lean practices eliminated waste and improved reliability;

traditional structures ensured compliance and oversight. One interesting observation is how lean's Last Planner System complemented Scrum's iterative planning. The Last Planner's focus on short-term commitment and removing roadblocks dovetailed with Scrum's sprint planning, each enhancing the other's effectiveness. Thus, the case lends support to Lalmi *et al.* (2021, 2022) proposition that integrating all three approaches yields superior outcomes. It demonstrates in practice what their conceptual models propose.

5.4 Collaborative Tools and Technology Utility:

The use of collaborative digital tools in the case was a clear enabler for the hybrid processes. Without the shared online platform, it would have been much harder to keep everyone informed and maintain transparency. The fact that even community members could access project information provided a level of openness uncommon in typical projects, and this likely contributed to trust. This underscores a practical point: technology can flatten communication hierarchies and disseminate information quickly, which is vital in stakeholder management. The case didn't explicitly use any AI tools, but given the positive experience with simpler tools, one can foresee that incorporating AI (as per Paul, 2023) could further streamline things like risk alerts or stakeholder sentiment analysis. The team at Salitre sometimes had to rely on intuition or manual analysis for decision-making; an AI system might have predicted the material delay or suggested optimal task sequencing faster. However, technology is not a panacea – it worked here because it was accompanied by a culture of transparency and willingness to use the tool.

5.5 Challenges and Critical Success Factors:

Finally, the case highlights essential success factors: strong leadership commitment, structured governance to manage potential scope creep, and proactive change management practices. These elements enabled successful hybrid implementation, balancing flexibility and rigor to achieve broader social and sustainability goals effectively.

However, it is important to recognize potential drawbacks associated with high levels of stakeholder participation. **Increased involvement can significantly raise the workload of the project management team**, due to the need to process multiple proposals, evaluate frequent design change requests, and manage expectations consistently. Additionally, extensive community engagement during the design phase could lead to professional interference, potentially limiting designers' and engineers' capacity for independent judgment and efficient revision processes. Such dynamics, while fostering transparency and ownership, may require **additional resources and structured boundaries** to ensure professional expertise remains effectively utilized and the project maintains efficiency and productivity.

5.6 Broader Impacts and Sustainability:

An interesting dimension of the Salitre Park Project is the focus on sustainability and community resilience (as indicated by integrating environmental criteria and aiming for an inclusive public space). The hybrid approach indirectly supported these broader goals. For instance, stakeholder involvement ensured that the park's design served the community's actual needs (thus likely to be well-maintained and utilized, contributing to social sustainability). The agile adjustments allowed incorporation of sustainable tech (solar lighting) effectively. This case thereby suggests that hybrid project management is well-suited for projects with sustainability and social objectives, because such projects benefit greatly from stakeholder input and cross-disciplinary collaboration. It could be argued that traditional approaches might have delivered a park *on paper* faster, but perhaps one that wasn't as aligned with community usage or sustainable features – potentially undermining the long-term success. Hybrid

approaches, by accommodating diverse inputs and iterative refinement, produced a facility that stakeholders are proud of and committed to, which is a critical outcome for any urban development project.

6. Conclusion

This study investigated the effectiveness of hybrid project management in construction, emphasizing stakeholder engagement through the Salitre Park Project. The results confirm that integrating traditional, agile, and lean practices significantly enhances stakeholder satisfaction while maintaining solid performance on traditional project indicators such as schedule and cost.

Key contributions of this study include:

- Providing empirical evidence that **hybrid project management can be effectively implemented in the construction sector**, particularly demonstrating that agile and lean methodologies can effectively coexist with traditional management frameworks.
- The study highlights **stakeholder management** as essential to hybrid project success, emphasizing proactive engagement and iterative stakeholder feedback as vital for achieving high project acceptance and satisfaction.
- Additionally, this research offers **practical strategies** and insights into overcoming typical challenges—such as initial resistance, team training, and scope control—providing valuable guidance for future implementations
- Contributing to the literature by bridging a gap between high-level Hybrid PM concepts and on-the-ground outcomes. By connecting our findings with recent studies (e.g., Lalmi et al., Fernandes et al., Gemino et al., Paul), this study extends the conversation with a case-based perspective that can inform both scholars and practitioners.

In conclusion, the success of the Salitre Park Project underscores that **hybrid project management, bolstered by collaborative tools, is a powerful approach for managing complex construction projects with diverse stakeholders**. It allows project teams to remain agile in the face of change and uncertainty, without losing the discipline needed for large-scale execution. Stakeholders become partners in the process, increasing the likelihood that the project's deliverables truly meet their needs and stand the test of time. For the field of project management, this case adds to the growing evidence that moving past the old "one-size-fits-all" methodology mindset can yield substantial benefits.

6.1 Recommendations:

Practitioners in construction (and beyond) should consider adopting a hybrid approach on projects that have significant stakeholder impact or uncertain scopes. Start small, perhaps by implementing agile-style reviews or Kanban boards in a subset of the project, and gradually expand hybrid practices as the team becomes comfortable. It is crucial to train the team and explain the *why* behind new practices to gain buy-in. Maintain some key traditional controls (like change control and baseline tracking) to guard against chaos, but don't hesitate to iterate plans for genuine improvements. For stakeholder engagement, actively invite stakeholders into the process – it can be eye-opening how much value this brings, turning adversaries into allies. From an academic perspective, further research could replicate this study in other contexts, such as private commercial construction or in different cultural settings, to see if the outcomes hold. It would also be useful to quantify long-term impacts (for example, does stakeholder satisfaction at project handover translate into better project sustainability or fewer maintenance issues later?). Additionally, future studies might explore the integration of emerging technologies (AI, digital twins) into hybrid project management, as suggested by

Paul (2023), to assess whether they further enhance stakeholder management and decision-making.

The case of Salitre Park demonstrates that by managing stakeholders as integral team members and by embracing a flexible yet structured approach, project managers can achieve the dual mandate of **efficiency and effectiveness** – delivering projects that not only meet the iron triangle constraints but also create lasting value and satisfaction for their stakeholders. This aligns well with the direction of modern project management practice, which is increasingly about delivering benefits and value, not just outputs. The hybrid paradigm, as evidenced here, is a promising pathway to that end.

7. References

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Use of Generative Artificial Intelligence

AI tools were used for translation support and language improvement in this article.

Communication aligned with the Sustainable Development Goals