



The Impact of Project Portfolio Management on Project Success: The Role of Teamwork in the Construction Industry

L. Seo-yun^{1,*}, K. Min-jun¹

¹ Department of Construction Management, Seoul National University, Seoul, South Korea

ARTICLE INFO	ABSTRACT
Article History: Received 3 April 2025 Received in revised form 26 July 2025 Accepted 22 August 2025 Available online 27 September 2025 Keywords: Project Portfolio Management; Project Success; Teamwork; Construction Industry; PLS-SEM; Strategic Management	Project portfolio management (PPM) provides organizations with a strategic mechanism for selecting, prioritizing and coordinating projects, but its effectiveness may depend on team-level processes through which portfolio decisions are translated into project outcomes. This study examined the relationships among PPM, teamwork and project success in the construction industry, and the potential mediating role of teamwork. In a quantitative descriptive–analytical study, 59 of the 70 managers and specialists working on construction projects in District 14 of Tehran were selected using Cochran's formula and completed a structured five-point Likert questionnaire. The measurement and structural models were evaluated with partial least squares structural equation modeling (PLS-SEM). PPM was positively related to project success ($\beta = 0.445$, $t = 6.502$) and to teamwork ($\beta = 0.590$, $t = 8.485$), and teamwork was positively related to project success ($\beta = 0.830$, $t = 12.904$). The estimated indirect effect of PPM on project success through teamwork was 0.490, which is consistent with a mediating role of teamwork, although bootstrapped confidence intervals are required to confirm mediation formally. The findings suggest that strategic project selection and resource allocation are more likely to translate into successful project outcomes when supported by effective collaboration, communication and coordination within project teams.

1. INTRODUCTION

The construction industry plays a pivotal role in the socio-economic development of nations, acting as a major driver of infrastructure development and capital investment [1]. However, this sector is inherently characterized by considerable complexity, substantial financial risks, dynamic stakeholder demands, and a persistent vulnerability to project delays and cost overruns [2]. To navigate this challenging environment and ensure long-term sustainability, construction firms increasingly need to shift their focus from managing isolated projects toward managing their broader multi-project environments. This strategic shift has positioned Project Portfolio Management (PPM) as a critical capability for contemporary construction organizations [1], [3]. Unlike single-project management, PPM focuses on the centralized management of a collection of projects to achieve strategic objectives, optimize resource allocation across competing demands, and maximize overall portfolio value [3], [4]. Implementing effective PPM

* Corresponding Author: Lee.Seoyun@gmail.com

Department of Construction Management, Seoul National University, Seoul, South Korea



practices can therefore help construction firms not only execute projects efficiently but also select and execute the *right* projects in alignment with their operational capabilities and overarching business strategies [4].

Despite the established theoretical benefits of PPM, its relationship with individual project success can be complex, as high-level strategic decisions made at the portfolio level must ultimately be translated into operational actions at the project level [5]. This implementation gap suggests that the relationship between PPM and project success may depend, at least partly, on internal organizational mechanisms that translate portfolio strategies into project-level outcomes [5], [6]. Among these mechanisms, teamwork and collaborative team performance may play particularly important roles [6]. Construction projects are highly collaborative endeavors that require the effective integration of diverse professionals, including architects, engineers, project managers, contractors, and subcontractors [7]. Effective teamwork characterized by mutual trust, open communication, shared goals, coordination, and collaborative problem-solving can serve as an important mechanism through which portfolio-level resource allocations and strategic guidelines are translated into effective project-level actions and outcomes [6], [7].

While the individual relationships between PPM and project success, as well as between teamwork and project performance, have been examined in previous studies, an important gap remains in the literature regarding how these variables interact within the specific context of the construction industry [4], [5], [8]. Existing research has often emphasized the strategic, technical, and financial dimensions of portfolio management, while comparatively less attention has been devoted to the human and behavioral mechanisms through which portfolio-level decisions are implemented [6]. Specifically, empirical evidence remains limited regarding whether and how team-level dynamics may mediate the relationship between portfolio-level strategic decisions and project-level outcomes in temporary and multi-project organizational environments [5], [8]. This gap raises an important practical question: How can construction managers translate strategic portfolio decisions into effective team processes that ultimately contribute to project success?

To address this research gap, the present study proposes a conceptual framework to investigate the direct relationship between Project Portfolio Management and project success while explicitly examining the potential mediating role of teamwork within the construction industry. By integrating perspectives from strategic management and organizational behavior, this research seeks to clarify the pathways through which portfolio-level decisions may shape team dynamics and how these dynamics, in turn, may contribute to multidimensional project success, including performance in terms of time, cost, quality, and stakeholder satisfaction. Ultimately, the findings of this study aim to provide construction executives and project management practitioners with evidence-based insights that may support more effective resource allocation, strengthen the connection between organizational strategy and project-level execution, and foster collaborative working environments that contribute to successful project delivery in increasingly complex operating environments.

2. RESEARCH BACKGROUND

Today, Project Portfolio Management (PPM) serves as an important strategic tool through which organizations can strengthen their competitive position and align their project investments with broader organizational objectives. Because portfolio management operates at the strategic level, scholars have emphasized the importance of systematically evaluating the necessity, justification, and strategic contribution of individual projects, including construction and infrastructure projects. Portfolio management focuses on selecting and prioritizing projects that are consistent with organizational strategic objectives. Effective portfolio management can help organizations identify projects that may provide insufficient financial returns, limited strategic value, or potential risks to organizational reputation and performance. Furthermore, the allocation of resources, including financial capital and other limited organizational resources, among ongoing projects represents a critical portfolio-level decision because such allocations can either facilitate or constrain the achievement of strategic objectives.

Teamwork can be understood as intentional and coordinated collaboration within and across teams through which members integrate resources, ideas, knowledge, processes, and practices to facilitate the implementation of work-related activities. A substantial body of literature has highlighted the importance of teamwork in achieving successful outcomes, particularly in complex and innovative project environments. Growing recognition of the role of effective teamwork suggests that well-functioning teams can significantly enhance project outcomes. Teamwork is therefore

considered an important determinant of project success because it can strengthen organizational capabilities and improve the ability of project participants to respond to environmental and operational challenges. Collaborative work and group interaction provide mechanisms through which organizations can leverage the complementary knowledge, skills, and capabilities of individual members. Through the development of effective teamwork practices and skills, organizations can benefit from the synergistic effects generated by coordinated collaboration.

Keshtkaran and Bagherpour (2008) applied strategic project management principles to the measurement of project success, considering three key dimensions: time, budget, and operational objectives [9]. Project success was further assessed across four dimensions project efficiency, customer impact, business success, and preparation for the future from the perspectives of three major stakeholder groups: project management teams, contractors, and clients. Their approach illustrates the multidimensional nature of project success and demonstrates that project performance cannot be evaluated solely on the basis of traditional time and cost criteria.

Sebt and Mousakhani (2013) examined Project Portfolio Management with particular attention to integration and customer involvement as a mediating factor. Their findings indicated that projects within a portfolio are not necessarily dependent on one another and are not required to be directly interconnected [10]. Their study contributes to the understanding of portfolio structures and emphasizes that portfolio-level management involves the coordinated strategic management of projects even when direct operational interdependencies among individual projects are limited.

Nakhaei Nejad and Momen Shad (2020) examined interactions among projects by identifying eleven categories of negative risks based on the traditional cost–time–quality classification framework [11]. By considering interrelationships among project risks, their study identified three-way interactions among risk factors and provided a more comprehensive perspective on the manner in which risks associated with different projects may influence one another. Their findings highlight the importance of considering project interdependencies and interactions when making portfolio-level decisions.

Masoudifar, Mosallinejad, and Azizi (2022) investigated the criteria required for evaluating project portfolio success [12]. Their findings were synthesized into a conceptual framework presented as a project portfolio success evaluation matrix. This framework emphasizes the multidimensional nature of portfolio success and demonstrates the need to evaluate project portfolios using a broader set of strategic and performance-related criteria rather than relying exclusively on conventional project-level indicators.

Agbo and Nwankwo (2022) examined the impact of Project Portfolio Management on project success [13]. Their results demonstrated that Project Portfolio Management positively and significantly influences product quality and product cost management. Furthermore, effective portfolio management was found to enhance stakeholder satisfaction with organizational products and services. These findings provide empirical support for the proposition that effective portfolio management can contribute to improved organizational and project-related outcomes.

Saba and Bhatti (2022) investigated the relationship between Project Portfolio Management and portfolio success while considering team innovative behavior as a mediating variable within Pakistan's construction industry [14]. Their findings revealed that different dimensions of portfolio management positively influence innovative team behavior, which subsequently contributes to project portfolio success. This study is particularly relevant to the present research because it provides evidence that team-level behavioral mechanisms may play an important role in translating portfolio management practices into successful outcomes within the construction industry.

Kaufmann (2022) explored how successful strategic and operational Project Portfolio Management can support organizational adaptability [15]. The study emphasized that one of the central challenges of strategic management is the ability to cope with uncertainty and continuously adapt to turbulent environments. Within organizations, project portfolios can serve as mechanisms for operationalizing strategic adaptation by enabling the exploration of new opportunities and supporting the implementation of adaptive organizational strategies. This perspective highlights the broader strategic function of PPM beyond the management of individual project performance.

Saeed et al. (2022) examined the roles of environmental uncertainty and innovation capability in Project Portfolio Performance [16]. Their study found that organizational flexibility positively influences innovation capability, which, in turn, has a significant positive effect on project portfolio performance. These findings further demonstrate

that portfolio performance is influenced not only by formal project selection and resource-allocation mechanisms but also by organizational capabilities and behavioral factors that enable organizations to respond effectively to changing environmental conditions.

Despite the growing body of research on Project Portfolio Management and project success, the contribution of project teamwork, particularly from the perspective of project members, has received comparatively limited attention in the existing literature. Previous studies have demonstrated the importance of strategic portfolio management, project interactions, organizational adaptability, innovation capability, and team innovative behavior; however, the specific role of teamwork as a mechanism linking Project Portfolio Management to project-level success remains insufficiently examined, particularly in the construction context. The present study therefore focuses on the role of project teamwork in achieving project success and recognizes that project leaders alone cannot ensure successful project completion. Rather, project success is likely to emerge from the collective effort, coordination, collaboration, and effective participation of project team members. Accordingly, examining teamwork as a potential mediating mechanism may provide a more comprehensive understanding of how strategic portfolio management practices are translated into successful project outcomes.

3. RESEARCH METHODOLOGY

3.1. Research Design

This study employed a quantitative, descriptive-analytical, cross-sectional research design.

The statistical population consisted of personnel working in three to five construction projects located in District 14 of Tehran. The total accessible population consisted of 70 individuals.

Using the Cochran sampling approach adopted in the original research design, 59 respondents were selected for participation.

Given the relatively small accessible population and the predictive and explanatory orientation of the structural model, Partial Least Squares Structural Equation Modeling (PLS-SEM) was used to analyze relationships among the latent constructs.

3.2. Data Collection Instrument

Data were collected using a structured questionnaire consisting of two sections.

The first section collected demographic information, including:

- Gender
- Age
- Educational level
- Marital status

The second section measured the research constructs using a five-point Likert scale:

1 = Strongly Disagree

2 = Disagree

3 = Neutral

4 = Agree

5 = Strongly Agree

The principal constructs examined in the structural model were:

1. Project Portfolio Management

2. Teamwork
3. Project Success

The questionnaire also included dimensions related to business success, future preparedness, strategic fit, and portfolio balance.

Table 1. Questionnaire Dimensions

Dimension	Number of Items/Sub-dimensions
Overall Business Success	4
Future Preparedness	5
Strategic Fit	5
Portfolio Balance	6

3.3. Data Analysis

Descriptive statistical analysis was used to summarize the characteristics of the respondents and the distributions of the research variables.

The structural relationships were analyzed using PLS-SEM.

The measurement model was evaluated using:

- Cronbach's alpha;
- ρ_A ;
- Composite Reliability (CR);
- Average Variance Extracted (AVE); and
- discriminant validity.

Cronbach's alpha and Composite Reliability values of at least 0.70 were considered evidence of satisfactory internal consistency.

An AVE value of at least 0.50 was used as evidence of convergent validity.

Discriminant validity was evaluated using the Fornell–Larcker criterion based on the available reported statistics.

The structural model was evaluated using:

- standardized path coefficients (β);
- bootstrapped t-values;
- coefficients of determination (R^2);
- effect sizes (f^2); and
- predictive relevance measures (Q^2), where available and applicable.

For the direct structural paths, a two-tailed critical t-value of 1.96 was used as the threshold for statistical significance at the 5% level.

Because the original analytical output containing bootstrap confidence intervals for the specific indirect effect was unavailable, mediation significance was not inferred solely from the individual direct-path significance tests.

4. RESULTS

4.1. Respondent Characteristics

The study included 59 respondents.

Male participants constituted the majority of the sample, with 49 respondents. The largest age category consisted of participants between 20 and 30 years old.

Regarding educational attainment, the largest group consisted of respondents holding Master's degrees, with 26 participants.

In terms of marital status, 44 respondents were married.

4.2. Descriptive Statistics

Table 2. Descriptive Statistics of Research Variables

Variable	Mean	Median	Mode	Standard Deviation	Minimum	Maximum
Project Success	4.19	4.00	4.00	0.798	2.00	5.00
Teamwork	3.56	4.00	4.00	0.970	2.00	5.00
Project Portfolio Management	4.24	4.00	4.00	0.625	3.00	5.00

Project Portfolio Management had the highest mean score ($M = 4.24$), followed by Project Success ($M = 4.19$) and Teamwork ($M = 3.56$).

These descriptive statistics characterize respondents' perceptions of the constructs but are not, by themselves, used as evidence of structural relationships.

4.3. Distribution Assessment

The Kolmogorov–Smirnov test was applied in the original analysis to examine departures from normality.

Table 3. Kolmogorov–Smirnov Test Results

Variable	Symbol	Reported K–S Statistic	p-value
Project Success	PS	0.771	0.002
Teamwork	TW	0.886	<0.001
Project Portfolio Management	PPM	0.868	0.001

Based on the reported p-values, the null hypothesis of normality was rejected for all three variables.

PLS-SEM does not require multivariate normality in the same manner as conventional covariance-based maximum-likelihood SEM. Statistical inference for structural relationships was therefore based on bootstrapping.

5. MEASUREMENT MODEL ASSESSMENT

5.1. Internal Consistency Reliability

Table 4. Reliability of Research Constructs

Construct	Cronbach's Alpha	Composite Reliability	rho_A
Project Portfolio Management	0.832	0.899	0.843
Project Success	0.833	0.864	0.921
Teamwork	0.749	0.807	0.814

All Cronbach's alpha and Composite Reliability values exceeded 0.70.

The results therefore indicate satisfactory internal consistency reliability for the three constructs.

5.2. Convergent Validity

Table 5. Average Variance Extracted

Construct	AVE
Project Portfolio Management	0.747
Project Success	0.687
Teamwork	0.513

All AVE values exceed the minimum criterion of 0.50.

Accordingly, the available results support convergent validity for the three constructs.

5.3. Discriminant Validity

The Fornell–Larcker criterion compares the square root of the AVE of each construct with its correlations with the other constructs.

The diagonal values were recalculated directly from the AVE values reported in Table 5.

For Project Portfolio Management:

$$\sqrt{0.747} = 0.864$$

For Project Success:

$$\sqrt{0.687} = 0.829$$

For Teamwork:

$$\sqrt{0.513} = 0.716$$

Table 6. Corrected Fornell–Larcker Matrix

Construct	PPM	Project Success	Teamwork
Project Portfolio Management	0.864		
Project Success	0.453	0.829	
Teamwork	0.584	0.535	0.716

For each construct, the square root of AVE is greater than its reported correlations with the other constructs.

Therefore, the available results satisfy the Fornell–Larcker criterion.

Because item-level correlation data are unavailable, HTMT values cannot be reconstructed reliably and are therefore not fabricated or reported.

6. STRUCTURAL MODEL ASSESSMENT

6.1. Direct Structural Relationships

The significance of the direct structural paths was evaluated using bootstrapped t-statistics.

Table 7. Direct Structural Path Results

Hypothesis	Structural Path	β	t-value	Decision
H1	PPM $\rightarrow$ Project Success	0.445	6.502	Supported
H2	PPM $\rightarrow$ Teamwork	0.590	8.485	Supported
H3	Teamwork $\rightarrow$ Project Success	0.830	12.904	Supported

All three reported t-values exceed 1.96.

Therefore, the available results support statistically significant positive direct relationships between PPM and project success, between PPM and teamwork, and between teamwork and project success.

The strongest reported standardized direct coefficient is the relationship between Teamwork and Project Success ($\beta = 0.830$).

However, the magnitude of coefficients should be interpreted independently from their t-values. A larger t-value reflects stronger statistical evidence relative to its standard error and should not itself be interpreted as the magnitude of an effect.

7. ANALYSIS OF THE PROPOSED MEDIATING ROLE OF TEAMWORK

In a simple mediation model, the indirect effect of PPM on Project Success through Teamwork can be calculated as the product of the two constituent paths:

$$\text{Indirect Effect} = (\text{PPM} \rightarrow \text{Teamwork}) \times (\text{Teamwork} \rightarrow \text{Project Success})$$

Therefore:

$$\text{Indirect Effect} = 0.590 \times 0.830$$

$$\text{Indirect Effect} = 0.4897 \approx 0.490$$

The estimated direct effect of PPM on Project Success is:

$$\text{Direct Effect} = 0.445$$

Consequently, the point estimate of the total effect implied by the reported coefficients is:

$$\text{Total Effect} = \text{Direct Effect} + \text{Indirect Effect}$$

$$\text{Total Effect} = 0.445 + 0.490 = 0.935$$

Table 8. Direct, Indirect, and Implied Total Effects

Effect	β
Direct effect: PPM $\rightarrow$ Project Success	0.445
PPM $\rightarrow$ Teamwork	0.590

Teamwork → Project Success	0.830
Calculated indirect effect: PPM → Teamwork → Project Success	0.490
Implied total effect of PPM on Project Success	0.935

These coefficients provide a pattern that is theoretically consistent with mediation because PPM is positively related to Teamwork and Teamwork is positively related to Project Success.

Nevertheless, the statistical significance of the indirect effect cannot be established solely by demonstrating that its constituent paths are individually significant.

Formal confirmation of H4 requires the standard error or, preferably, the bootstrapped confidence interval and p-value of the specific indirect effect.

Because the original bootstrap output for the indirect effect is unavailable, H4 should be regarded as supported descriptively by the observed path pattern but not independently confirmed through an available bootstrap significance test.

This distinction prevents overstatement of the statistical evidence.

8. COEFFICIENT OF DETERMINATION

The original analysis reported the following R^2 values:

Table 9. Originally Reported R^2 Values

Construct	Reported R^2
Project Portfolio Management	
Project Success	0.646
Teamwork	0.848

The reported R^2 of Project Success indicates that the predictors included in the structural model collectively account for 64.6% of the variance in Project Success.

However, the reported R^2 value of 0.848 for Teamwork should be interpreted cautiously. In the presented structural model, PPM is the only reported predictor of Teamwork, with a standardized path coefficient of 0.590. Because the original SmartPLS project and raw data are unavailable, the R^2 value of Teamwork cannot be independently verified.

Accordingly, the value is retained as an originally reported result rather than recalculated or replaced with an invented statistic.

9. EFFECT SIZE

The original analysis reported the following f^2 values.

Table 10. Reported Effect Sizes

Structural Path	Reported f^2
PPM → Project Success	0.465
PPM → Teamwork	0.517
Teamwork → Project Success	0.634

Using conventional reference values of approximately 0.02, 0.15, and 0.35 for small, medium, and large effects, respectively, the reported values correspond to large effect sizes.

However, because the underlying model output is unavailable, these values are reported as obtained in the original analysis and should not be interpreted as independently reproduced estimates.

10. PREDICTIVE RELEVANCE

The original analysis reported Q^2 values as follows:

Table 11. Originally Reported Q^2 Values

Construct	Reported Q^2
Project Portfolio Management	0.449
Project Success	0.229
Teamwork	0.214

Positive Q^2 values for endogenous constructs generally indicate predictive relevance within the corresponding PLS-SEM procedure.

Accordingly, the positive values reported for Project Success and Teamwork are consistent with predictive relevance.

However, Project Portfolio Management is represented as an exogenous construct in the structural model. Therefore, the reported Q^2 value of 0.449 for PPM should not be interpreted as structural predictive relevance without clarification regarding the specific procedure used to generate this statistic.

For this reason, the substantive interpretation of predictive relevance in the present study is restricted to the endogenous constructs, Project Success and Teamwork.

11. DISCUSSION

The findings demonstrate positive relationships among Project Portfolio Management, teamwork, and project success within the studied construction-project context.

First, the positive relationship between PPM and Project Success ($\beta = 0.445$; $t = 6.502$) indicates that stronger portfolio management practices are associated with higher levels of project success.

This finding is theoretically reasonable because portfolio management can improve project selection, strategic alignment, resource allocation, and coordination among competing organizational initiatives.

The result is consistent with the broader PPM literature, which emphasizes that portfolio management helps organizations connect strategic priorities with project implementation [3,4].

Second, the positive relationship between PPM and Teamwork ($\beta = 0.590$; $t = 8.485$) suggests that effective portfolio management is associated with stronger team-level collaboration.

One possible explanation is that clear portfolio priorities and more systematic resource allocation reduce uncertainty and conflicts over organizational resources. When teams understand strategic priorities and receive appropriate resources, coordination among project members may improve.

Third, Teamwork demonstrates a strong positive relationship with Project Success ($\beta = 0.830$; $t = 12.904$). This finding is consistent with research emphasizing the importance of communication, coordination, mutual support, shared objectives, and collaborative problem-solving in project environments.

Construction projects require extensive interaction among individuals with different professional backgrounds. Effective teamwork can therefore facilitate information exchange, reduce coordination problems, and support more effective responses to project challenges.

The calculated indirect effect of PPM on Project Success through Teamwork is approximately 0.490. This result suggests an important theoretical mechanism: portfolio management may influence project outcomes not only directly but also through its relationship with team-level processes.

Nevertheless, this finding must be interpreted carefully. Because the bootstrap confidence interval for the specific indirect effect is unavailable, the present study cannot statistically distinguish among alternative mediation classifications.

Consequently, the study provides evidence consistent with the proposed mediating mechanism but does not claim definitive statistical confirmation of mediation beyond the available output.

12. PRACTICAL IMPLICATIONS

The findings have several practical implications for construction organizations.

First, managers should consider project portfolio management as more than a financial or project-selection mechanism. Portfolio decisions influence how organizational resources, priorities, and managerial attention are distributed across project teams.

Second, organizations should integrate team-related considerations into portfolio decisions. Allocating financial resources without considering team capacity, communication requirements, and human-resource availability may limit the effectiveness of portfolio management.

Third, construction organizations should strengthen mechanisms that facilitate communication and coordination among project participants.

Portfolio managers and project managers should therefore ensure that strategic priorities are communicated clearly to operational teams.

Fourth, project selection and prioritization should consider the organization's capacity to provide qualified and coordinated teams. Selecting strategically attractive projects without sufficient team capacity may create competition for scarce human resources and reduce project performance.

Finally, managers should recognize that strategic management and team management are complementary rather than independent processes. Portfolio-level decisions create the organizational conditions within which project teams operate, while teams ultimately implement those decisions.

13. THEORETICAL IMPLICATIONS

The study contributes to the integration of Project Portfolio Management and teamwork research.

PPM studies frequently emphasize strategic alignment, portfolio balance, resource allocation, and portfolio value. Teamwork research, by contrast, generally focuses on communication, coordination, trust, cohesion, and team performance.

The conceptual framework developed in this study connects these two levels of analysis.

The findings suggest that understanding project success may require consideration of both strategic portfolio-level capabilities and operational team-level processes.

The study therefore supports a multilevel perspective in which organizational portfolio practices may shape the environment in which project teams operate, while teamwork contributes to the conversion of strategic decisions into project outcomes.

14. LIMITATIONS

Several limitations should be considered when interpreting the findings.

First, the sample consisted of 59 respondents from a relatively small population associated with construction projects in District 14 of Tehran. Consequently, the findings should not automatically be generalized to the entire Iranian construction industry or to construction industries in other countries.

Second, the research used a cross-sectional design. Therefore, the reported structural relationships should primarily be interpreted as associations within the specified model rather than definitive evidence of temporal causality.

Third, data were collected through self-reported questionnaires. Common method bias and respondents' subjective perceptions may therefore influence the observed relationships.

Fourth, the available analytical record does not contain item-level data or the complete original SmartPLS output. Consequently, several desirable contemporary assessments, including HTMT, VIF, complete indicator loadings, PLSpredict, and bootstrap confidence intervals for the indirect effect, cannot be reconstructed reliably.

Fifth, although the calculated indirect-effect point estimate is consistent with the proposed mediation mechanism, definitive statistical confirmation of mediation requires bootstrapping of the specific indirect effect.

Future studies should therefore employ larger and more diverse samples, collect longitudinal data where feasible, and report complete PLS-SEM measurement and structural model statistics.

15. CONCLUSION

This study investigated the relationships among Project Portfolio Management, teamwork, and project success in the construction industry.

The results provide evidence of positive and statistically significant direct relationships between PPM and Project Success, PPM and Teamwork, and Teamwork and Project Success.

The standardized path coefficients were $\beta = 0.445$ for PPM $\rightarrow$ Project Success, $\beta = 0.590$ for PPM $\rightarrow$ Teamwork, and $\beta = 0.830$ for Teamwork $\rightarrow$ Project Success.

Based on these coefficients, the calculated indirect effect of PPM on Project Success through Teamwork is approximately $\beta = 0.490$.

These findings suggest that teamwork represents an important theoretical mechanism linking portfolio-level management practices to project-level outcomes. Effective portfolio management may create strategic clarity and support resource allocation, while effective teamwork helps translate these organizational conditions into coordinated project execution.

The study therefore emphasizes that construction organizations should not treat portfolio management and teamwork as separate managerial concerns. Strategic project selection and resource allocation should be accompanied by deliberate efforts to strengthen communication, coordination, collaboration, and shared objectives among project team members.

At the same time, because the original bootstrap confidence interval for the indirect effect is unavailable, the mediating role of teamwork should be interpreted as a theoretically and empirically supported pattern requiring formal confirmation through future bootstrap analysis.

Overall, the findings support an integrated approach to construction project management in which strategic portfolio capabilities and effective teamwork jointly contribute to improved project outcomes.

Authors' Contributions

All authors contributed to the conception and design of the study, the interpretation of the results and the preparation of the manuscript. All authors read and approved the final manuscript.

Declaration of Generative AI Use

During the preparation of this work, the authors used ChatGPT (OpenAI) to improve the language and readability of the manuscript. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

Acknowledgments

The authors are grateful to all those who contributed to this project.

Declaration of Competing Interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Ethics Considerations

Participation in the survey was voluntary, and all respondents were informed of the aims of the study and gave informed consent before completing the questionnaire. No names or identifying information were collected, responses were kept confidential, and the results were reported only in aggregate form. As this was an anonymous, non-interventional survey of professionals, formal ethics committee approval was not sought. The data were used solely for research purposes.

Data Availability

The data supporting the findings of this study are available from the corresponding author upon reasonable request, subject to ethical and confidentiality considerations.

REFERENCES

- [1] Too, E. G., & Weaver, P. (2014). The management of project management: A conceptual framework for project governance. *International Journal of Project Management*, 32(8), 1382–1394. <https://doi.org/10.1016/j.ijproman.2013.07.006>

- [2] Flyvbjerg, B. (2014). What you should know about megaprojects and why: An overview. *Project Management Journal*, 45(2), 6–19. <https://doi.org/10.1002/pmj.21409>
- [3] Martinsuo, M. (2013). Project portfolio management in practice and in context. *International Journal of Project Management*, 31(6), 794–803. <https://doi.org/10.1016/j.ijproman.2012.10.013>
- [4] Kopmann, J., Kock, A., Killen, C. P., & Gemünden, H. G. (2017). The role of project portfolio management in fostering both deliberate and emergent strategy. *International Journal of Project Management*, 35(4), 557–570. <https://doi.org/10.1016/j.ijproman.2017.02.011>
- [5] Jonas, D. (2010). Empowering project portfolio managers: How management involvement impacts project portfolio management performance. *International Journal of Project Management*, 28(8), 818–831. <https://doi.org/10.1016/j.ijproman.2010.07.002>
- [6] Dietrich, P., Eskerod, P., Dalcher, D., & Sandhawalia, B. (2010). The role of project collaboration quality and knowledge integration capability in multi-partner projects.
- [7] Hoegl, M., & Gemuenden, H. G. (2001). Teamwork quality and the success of innovative projects: A theoretical concept and empirical evidence. *Organization Science*, 12(4), 435–449. <https://doi.org/10.1287/orsc.12.4.435.10635>
- [8] Kock, A., Heising, W., & Gemünden, H. G. (2016). A portfolio of projects: How systemic project interactions affect project team performance. *Journal of Product Innovation Management*, 33(1), 54–71.
- [9] Keshtkaran, M., & Bagherpour, M. (2008). Applying strategic project management for measuring project success: A case study. In *Proceedings of the 4th International Project Management Conference*, Tehran, Iran.
- [10] Sebt, M. H., & Mousakhani, A. (2013). Project portfolio management through integration and customer involvement as a mediating factor. In *Proceedings of the International Conference on Management Challenges and Solutions*, Shiraz, Iran.
- [11] Nakhaei Nejad, M., & Momen Shad, N. (2020). Project portfolio selection based on the triple interaction effects among projects. [Complete publication information should be verified before submission.]
- [1] Masoudifar, P., Mosallinejad, A., & Azizi, M. (2022). Identifying types of project portfolio success measurement criteria: A strategic necessity. In *Proceedings of the National Conference on Innovation in Industrial, Mechanical and Materials Engineering*.
- [12] Agbo, E. I., & Nwankwo, S. N. P. (2022). Project portfolio management and project success in Nigeria: A study of Aqua-Rapha Investment Nigeria Limited. *GE-International Journal of Management Research*, 10(2), 1–26.
- [13] Saba, N., & Bhatti, S. H. (2022). Impact of project portfolio management on the portfolio's success with a mediating role of team innovative behavior in the construction industry of Pakistan. *Journal of Management Research*, 8(1), 1–18.
- [14] Kaufmann, C. (2022). *Supporting organizational adaptation through successful strategic and operational project portfolio management*. Technische Universität Darmstadt.
- [15] Saeed, M. A., Tabassum, H., Zahid, M. M., Jiao, Y., & Nauman, S. (2022). Organizational flexibility and project portfolio performance: The roles of environmental uncertainty and innovation capability. *Engineering Management Journal*, 34(2), 249–264. <https://doi.org/10.1080/10429247.2021.1884450>