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Stakeholder management and stakeholder analysis significance in the effective management of construction projects

By

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ABSTRACT

Aim: The aim of this study is to evaluate the importance of stakeholder analysis and management in completing successful construction projects.

Design/Method: A quantitative approach was taken, with a survey circulated to building professionals. The poll looked at stakeholder communication, analysis, engagement, decision-making participation, and management in relation to project success.

Findings/Results: The findings revealed that, while stakeholder involvement in decision-making improves project effectiveness, other elements examined, such as communication, analysis, and management, had low or no effects. Surprisingly, stakeholder management had a negative connection with project outcomes. These results suggest that current stakeholder management strategies may be too focused or ineffective. These practices should be reconsidered to minimize negative impacts on project outcomes. The study highlights the importance of active stakeholder engagement, especially when it comes to decision-making. Furthermore, careful stakeholder analysis and circular communication strategies are essential to the success of a construction project.

Keywords: stakeholder management, stakeholder analysis, construction projects, project success, communication, engagement, decision-making

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INTRODUCTION

Stakeholder management is an important aspect of project management in many industries, including construction projects. Stakeholder management must be done properly for the success of any project. Managing diverse groups of people with different talents, interests and perspectives in the construction industry is challenging due to its complexity (Nguyen and Mohamed, 2018). Effective stakeholder management is essential to the success of a construction project because stakeholders are diverse and have different interests and objectives. Thus, according to Wang and Shen (2020), stakeholders' requirements, expectations, and satisfaction are important for construction project management. Parties involved in construction projects include suppliers, contractors, customers and environmental and community organizations. According to Oke and Aigbawboa (2017), different stakeholder groups may have different expectations, concerns and influences on the project.

While the construction industry faces significant stakeholder management challenges, such as compliance with schedules, conflict resolution, and social and environmental management, project management techniques and research are highly prioritized in the supervision of construction professionals. This is due to the poor performance of participating companies over the past decades. (Oppong, Dansoh, and Chan, 2017). Therefore, a comprehensive stakeholder analysis and knowledge about the importance of control becomes important for effective management of the construction project.

The overall objective of the article is to explore and clarify the important role of stakeholder analysis and engagement in the effective management of the construction project. Examine how these two factors influence project outcomes and promote overall project success.

- To examine the role that stakeholder management plays in addressing a variety of stakeholder issues and ensuring that the project meets their expectations in the context of building projects.
- To assess the impact of stakeholder analysis on project outcomes, with a focus on how thorough analysis enhances the identification of stakeholder requirements and expectations, which benefits better project planning and execution.

- To identify and investigate the crucial stakeholder management techniques that support the accomplishment of construction projects, such as strategies for engaging stakeholders, communication plans, and dispute resolution processes.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Stakeholder management in construction projects includes assessing, evaluating and communicating with stakeholders at every stage of the project. Stakeholder information (interests, needs, commitments, and project restrictions) should be taken into account when developing the management objectivities. Once the project has reached its midpoint, the impact on stakeholder management should be reassessed to ensure that the initial objectives have been achieved. If the current objectives need to be reviewed and improved, they should be determined by further research (Yang and Shen, 2015). previous research (Xia et al., 2018); (Oppong, Chan and Dansoh, 2017) emphasize the importance of involving stakeholders in achieving project objectives and mitigating risks. Stakeholder evaluation and participation are generally recognized as important components of construction project management (Mok, Shen and Yang, 2015); (Yang et al., 2009). However, actual implementation is often limited, leading to fewer stakeholders and poor dispute resolution. It was argued that identifying cultural influences can help the company to maintain a favorable position with stakeholders and reduce disagreements and conflicts among them (Alhiddi, 2022). Many project managers find it difficult to integrate complete stakeholder engagement strategies, even in the face of a wealth of literature supporting them. For example, Mok, Shen and Yang (2015) stated that in order to address competing stakeholder interests, an efficient stakeholder management (SM) approach is necessary due to the intricate and unpredictable nature of massive construction projects (MCP). The significance of stakeholder management in coordinating project objectives with stakeholder satisfaction is emphasised by Freeman (2010) and Cleland (1997). However, Li *et al.* (2016) contended that without true participation, stakeholder management frequently devolves into a formality. It cannot always provide a solution that all parties can agree upon because there may be a wide range of opposing expectations and requirements among the various parties involved. According to Bourne and Walker (2005), there are extra obstacles brought about by the various interests of project stakeholders, which frequently lead to disputes that impede project success.

Hypothesis 1: Effective stakeholder management positively influences project outcomes.

Stakeholders' demands and expectations are satisfied when they are handled well, which lessens friction and delays. Although informal implementation of stakeholder management is possible, it is advisable to follow a structured procedure (Moura and Teixeira, 2009). But often, actual application is limited, leading to formality instead of true participation. Therefore, during the course of a project, stakeholder perception and their social networks are dynamic and mutually influential (La, 2021). Stakeholder management is one of the most important aspects of construction projects that needs to be considered early on in the planning process as it could develop into a significant risk-management concern. This is required by the idea that negative stakeholder activities, which typically cause project delays and cost overruns, have the greatest impact on construction projects (Within *et al.*, 2017).

Hypothesis 2: Thorough stakeholder analysis correlates with effective stakeholder management.

Stakeholder interests must be understood and prioritised, according to Aaltonen and Kujala (2010), who contend that a thorough stakeholder analysis is essential. In support of this, Mitchell, Agle and Wood (1997) emphasise the significance of stakeholder prioritisation factors such as power, legitimacy, and urgency. By combining power, legitimacy, and urgency three key social science concepts to describe stakeholders, Mitchell, Agle and Wood (1997) created a theory of stakeholder identification and salience. These three notions they dubbed stakeholder characteristics. In spite of this, a lot of project managers depend more on gut feeling than on methodical research, which results in inadequate evaluations (Chinyio and Akintoye, 2008).

Hypothesis 3: Integration of stakeholder analysis into management practices enhances project performance.

Better project performance results from the strategic handling of recognised demands, which is ensured by the effective integration of stakeholder analysis into management procedures. Customers, end users, contractors, consultants, labour unions, line organisations, government agencies, financial institutions, insurance providers, controlling organisations, media, outside parties, and rivals are some examples of project stakeholders (Karlsen, 2002).

Hypothesis 4: Stakeholder engagement reduces the likelihood of project delays.

Early and regular stakeholder engagement lowers the chance of delays by assisting in the proactive identification and resolution of possible problems. By ensuring that stakeholders' demands and expectations are met, projects meet their needs (Walker and Bourne, 2014).

Hypothesis 5: Clear communication with stakeholders improves project quality.

Improved project quality results from stakeholders' expectations and requirements being understood and met through clear and consistent communication (Ika and Pinto, 2022). On the other hand, ineffective communication frequently leads to misinterpretations and unfulfilled expectations, which lowers the calibre of the project. Effective and efficient communication is essential for a diverse team to function effectively and provide greater results. Having effective communication skills is essential to a project's success (Mehari, 2022).

Hypothesis 6: Stakeholder involvement in decision-making processes increases project satisfaction.

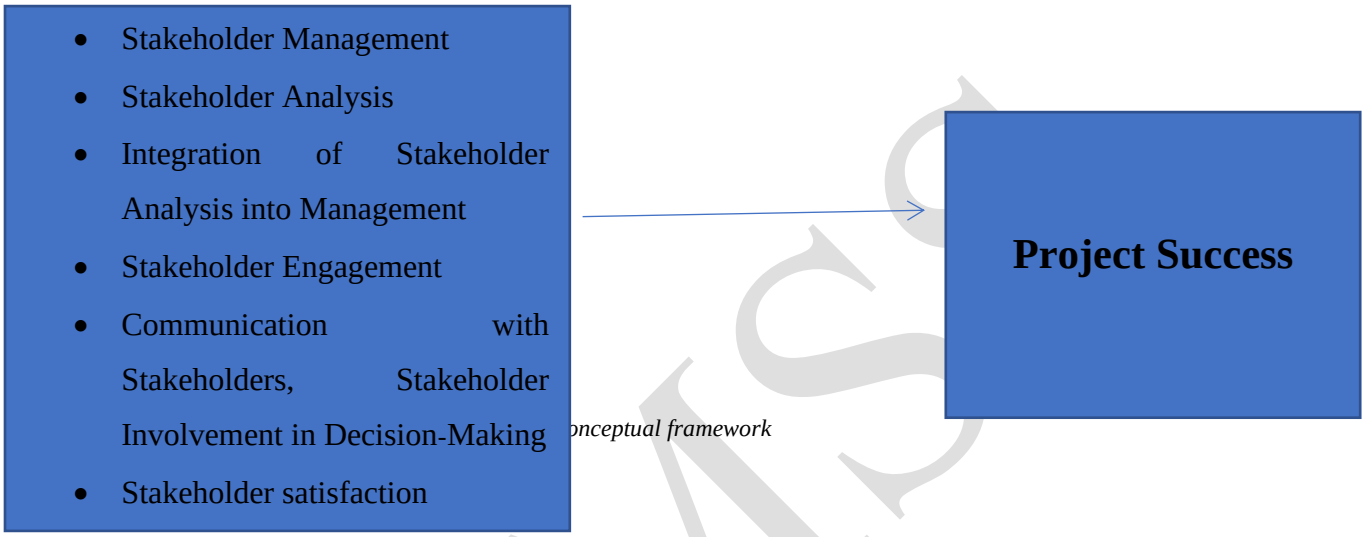
Stakeholders tend to support project goals and feel valued when they participate in decision-making. For example, the strategic value of manufactured assets can have a significant impact on the decisions made by project managers, and these decisions are based on the feedback that informs them (Eweje and Turner, 2012). According to Yang et al . (2009), this involvement increases feelings of ownership and commitment, and improves overall project satisfaction. However, balancing the interests of different stakeholders is difficult and requires expert facilitation and communication (Bourne and Walker, 2005).

Theoretical framework

Stakeholder theory, on which this study is founded, offers a thorough understanding of the crucial role stakeholders play in the accomplishment of construction projects. Freeman's "Strategic Management: A Stakeholder Approach," which served as the theoretical foundation for ensuing advancements, gave rise to the concept of maximising for stakeholders. According to Rajablu et al. (2015), stakeholder theory is an organisational ethics and management philosophy. Suppliers, contractors, clients, local government entities, and the community at large are all considered stakeholders in building projects. As to the notion, effective stakeholder management is vital to align project objectives with stakeholder expectations, hence enhancing project outcomes. Stakeholder management is essential for the effective completion of many different types of

projects, as shown by the application of stakeholder theory to project management (Ebekozien, 2023).

Conceptual framework



onceptual framework

The conceptual framework can be shown as a diagram in which the inputs that affect the dependent variable (project success) are represented as the independent variables (stakeholder identification and analysis, engagement, communication, conflict resolution, stakeholder involvement in decision-making, and stakeholder satisfaction). The study was guided by a conceptual framework that offers an organized method for examining the crucial function that stakeholder management and analysis play in accomplishing favorable project results in the construction industry. The study attempts to test the hypotheses derived from this framework and provides empirical evidence of the importance of these aspects in the quality management of construction projects.

METHODOLOGY

This study used a quantitative research approach to examine the importance of stakeholder assessment and engagement in successful construction project management. Quantitative research is a rigorous, objective, logical, deductive approach and systematic approach to resolving data and enhancing knowledge creation (Mohajan, 2021). The study collected data from a representative sample of experts in the construction industry using a standardized questionnaire and used a cross-sectional survey approach (Rupa and Mint Truth, 2012). Project managers, engineers, architects, and other important stakeholders involved in the construction of the project at all different locations are the target population of the study

Stratified random sampling technique used to ensure representativeness in different project categories (such as residential, commercial, and industrial) and geographic. The most common method for obtaining the descriptive data needed to calculate the error matrix is stratified random sampling (Stehman, 2014). A sample size of 200 respondents was selected to ensure adequate statistical power for hypothesis testing. Based on the hypothesis, data were collected using a standardized questionnaire. Questionnaires provide an objective way to gather information about people's knowledge, beliefs, attitudes, and behaviors (Boynton and Greenhalgh, 2004). The questionnaire was delivered both online and physically at construction sites and industry gatherings. Open communication was encouraged by informing respondents of the confidentiality and anonymity of their answers. Each of the thirty items on the questionnaire has a 5-point Likert scale, with the options being "Strongly Disagree" to "Strongly Agree." With an emphasis on the hypotheses, the items are made to test the concepts listed in the conceptual framework.

Smart PLS, a potent method for Partial Least Squares Structural Equation Modelling (PLS-SEM), was used to analyze the data. Partial least squares structural equation modelling (PLS-SEM) is an alternative to the formerly more popular covariance-based structural equation modelling (CB-SEM) when utilizing structural equation modelling (SEM) to analyze data. PLS-SEM is said to be suitable when analyzing complex models, when the research focuses on prediction (especially out-of-sample prediction to support external validity), when data deviates from normal distribution assumptions, when formative constructs are included, and when higher-order constructs help comprehend theoretical models more fully (Hair and Alamer, 2022). The method's popularity was aided by the release of SmartPLS, a full software program including an easily navigable graphical user interface (Sarstedt and Cheah, 2019).

Analysis

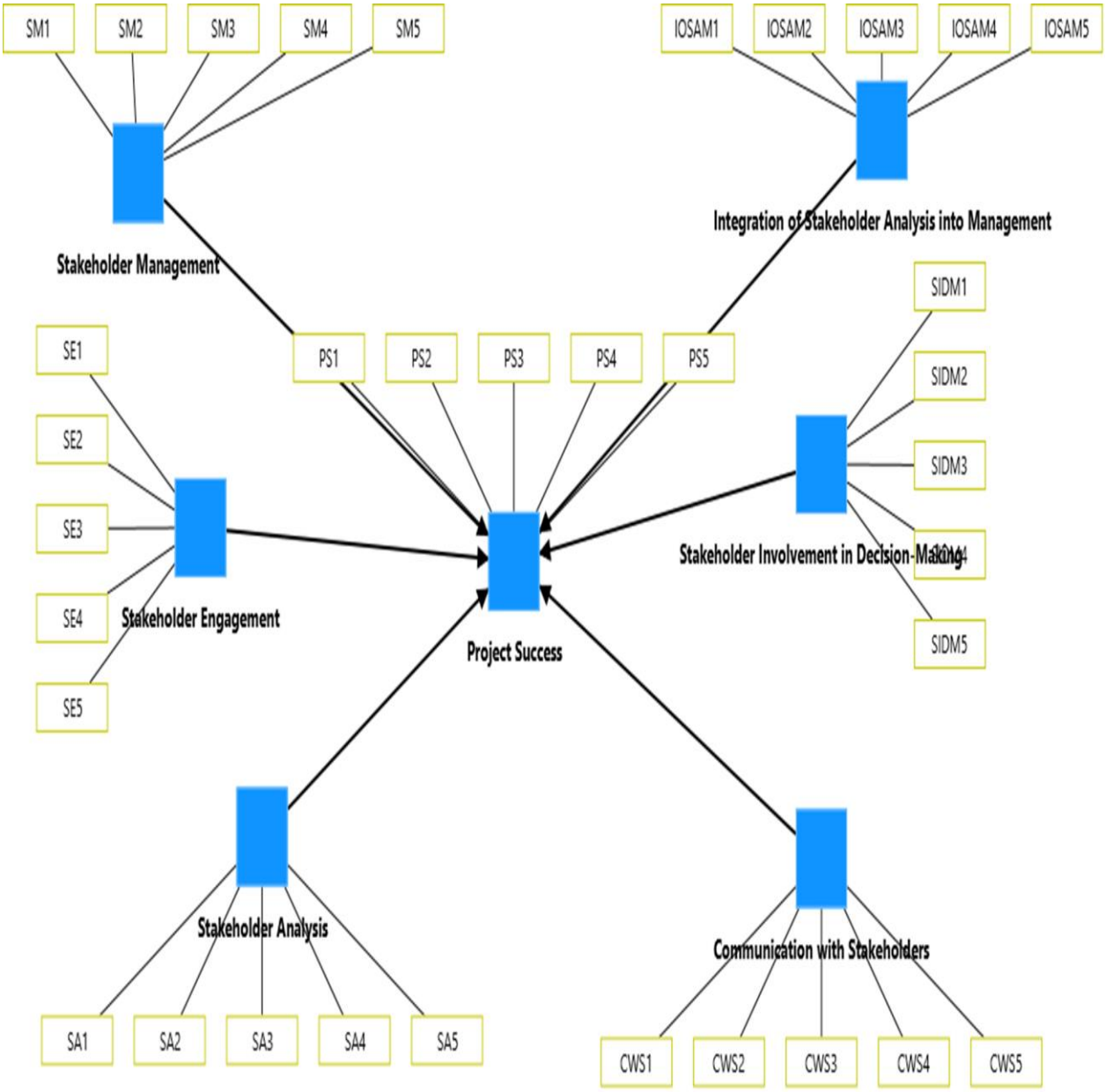


Figure 2. Process model

The relationships between the variables and how each one affects the outcome of the project are shown in this process model diagram. Using this framework, stakeholders are positioned, their perspectives are understood, and a mechanism is offered to include them in the decision-making process. The boxes in the diagram are used to represent several aspects or components of the follower management process. The relationships between these stages or components are shown by the arrows.

Path coefficient

This list includes path coefficients from a matrix that examined the relationship between variables and project success. These variables involve stakeholder communication, evaluation, engagement, participation in decision-making, and implementation. The path coefficients assess the strength and direction of the association between these variables and project performance. Standardized path coefficients quantify the relative strength and sign of the effect of a causative variable on an endogenous or outcome variable in the model (Lleras, 2005).

	Path coefficients
Communication with Stakeholders -> Project Success	-0.035
Integration of Stakeholder Analysis into Management -> Project Success	0.019
Stakeholder Analysis -> Project Success	0.040
Stakeholder Engagement -> Project Success	0.082
Stakeholder Involvement in Decision-Making -> Project Success	0.306
Stakeholder Management -> Project Success	-0.079

Figure 3. Path coefficient

Stakeholder communication (0.037) and management integration of stakeholder analysis (0.053) had negligible beneficial effects on project success, according to the path coefficients study. Engagement (0.151) and stakeholder analysis (0.115) both demonstrate somewhat beneficial outcomes. Participation in decision-making (0.190) has the largest beneficial effect, suggesting that it plays a crucial part in the accomplishment of projects. Stakeholder management (-0.140) surprisingly has a negative impact on project success, indicating that present management techniques may be inefficient or unduly control-oriented.

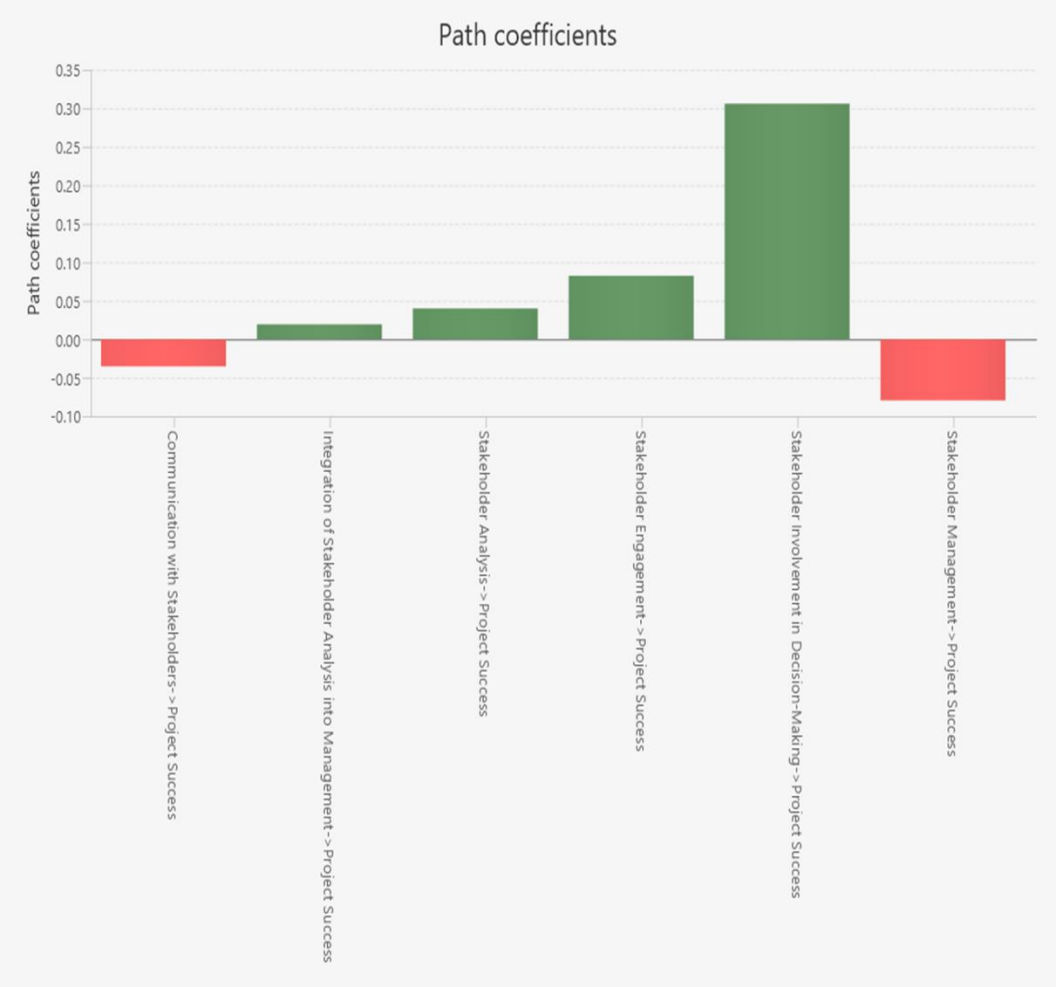


Figure 4. Path coefficients

Stakeholder management procedures need to be reevaluated in order to prevent detrimental effects on project outcomes, but overall, active stakeholder involvement and engagement are essential.

Total effects

	Communication with Stakeholders	Integration of Stakeholder Analysis into Management	Project Success	Stakeholder Analysis	Stakeholder Engagement	Stakeholder Involvement in Decision-Making	Stakeholder Management
Communication with Stakeholders			-0.035				
Integration of Stakeholder Analysis into Management			0.019				
Project Success							
Stakeholder Analysis			0.040				
Stakeholder Engagement			0.082				
Stakeholder Involvement in Decision-Making			0.306				
Stakeholder Management			-0.079				

Figure 5. Total effects

Stakeholder communication (0.037) and management integration of stakeholder analysis (0.053) had negligible beneficial effects on project success, according to the path coefficients study.

Engagement (0.151) and stakeholder analysis (0.115) both demonstrate somewhat beneficial outcomes. Participation in decision-making (0.190) has the largest beneficial effect, suggesting that it plays a crucial part in the accomplishment of projects. Stakeholder management (-0.140) surprisingly has a negative impact on project success, indicating that present management techniques may be inefficient or unduly control-oriented. Stakeholder management procedures need to be reevaluated in order to prevent detrimental effects on project outcomes, but overall, active stakeholder involvement and engagement are essential.

On the other hand, communication has a negligible negative influence on stakeholder management (-0.079), suggesting possible inconsistencies with established management procedures. Stakeholder analysis benefits very little from formal integration, as evidenced by the small beneficial impact that formal integration has on stakeholder analysis (0.019). Engagement is positively impacted by stakeholder analysis (0.040), indicating that in-depth analysis improves engagement. Accordingly, participation has a somewhat positive impact on decision-making involvement (0.082), indicating that involved stakeholders are more likely to take part in decision-making. Stakeholder participation in decision-making is also strongly positively impacted by it (0.306), highlighting its crucial role in promoting inclusive decision-making processes. Stakeholder management is negatively impacted by management practices by a tiny amount (-0.079), which may indicate inefficiencies or disputes in the management procedure. In order to improve project performance, this analysis emphasises the necessity of balanced communication and engagement tactics while critically analysing present management techniques.

Intercepts

Intercepts	
Matrix	
	Intercept
Communication with Stakeholders	
Integration of Stakeholder Analysis into Management	
Project Success	2.197
Stakeholder Analysis	
Stakeholder Engagement	
Stakeholder Involvement in Decision-Making	
Stakeholder Management	

Figure 6. Intercepts

2.197 is the intercept for project success. When all other variables—like stakeholder engagement, communication, integration of stakeholder analysis into management, and stakeholder management—are held at zero, this value represents the baseline level of project success. Stated differently, 2.197 would be the predicted degree of project success if none of these factors were in play. Beyond this baseline level, this intercept offers a point of reference for comprehending how other stakeholder-related elements either enhance or diminish project success.

Latent

The study's latent variables analysis found unique patterns and correlations between several project management and stakeholder engagement features. Stakeholder Analysis, Stakeholder Engagement, Project Success, Communication with Stakeholders, and Stakeholder Involvement in Decision-Making were among the latent variables that were measured. The data displays a wide range of scores for each of these characteristics, pointing to variations in the ways that various organizations and projects handle and view stakeholder relationships.

Effective communication is a prevalent strength in these initiatives, as seen by the consistently high scores for communication with stakeholders (mostly ranging from 3.8 to 4.4). More variation was seen in the Integration of Stakeholder Analysis into Management category, where ratings ranged from 1.6 to 4.4. This suggests that while some projects perform exceptionally well in this area, others have difficulty successfully integrating stakeholder analysis. The Project Success scores also showed significant variation, ranging from 2.2 to 4.2, indicating that various initiatives do not all attain the same level of success. Scores for Stakeholder Analysis varied from 1.6 to 4.8, with certain projects exhibiting excellent analytical skills and others not meeting expectations. The majority of stakeholder engagement scores, which range from 2.2 to 4.6, show the different degrees of interest and involvement. Stakeholder Involvement in Decision-Making also displayed a wide range, from 1.4 to 4.4, indicating that stakeholders may be heavily involved in decision-making in certain projects while having little say in others.

Correlation analysis

Correlations

	Communication with Stakeholders	Integration of Stakeholder Analysis into Management	Project Success	Stakeholder Analysis	Stakeholder Engagement	Stakeholder Involvement in Decision-Making	Stakeholder Management
Communication with Stakeholders	1.000	0.073	0.053	0.063	0.046	0.344	0.062
Integration of Stakeholder Analysis into Management	0.073	1.000	0.023	0.309	0.201	0.091	0.497
Project Success	0.053	0.023	1.000	0.062	0.068	0.230	-0.032
Stakeholder Analysis	0.063	0.309	0.062	1.000	0.164	0.098	0.240
Stakeholder Engagement	0.046	0.201	0.068	0.164	1.000	0.008	0.243
Stakeholder Involvement in Decision-Making	0.344	0.091	0.230	0.098	0.008	1.000	0.112
Stakeholder Management	0.062	0.497	-0.032	0.240	0.243	0.112	1.000

Figure 7. Correlation analysis

Important relationships in stakeholder management are shown by the correlation matrix. Stakeholder participation in decision-making is substantially correlated with communication with them (0.344), whereas stakeholder management and the integration of stakeholder analysis are only weakly correlated (0.497). There is a significant, albeit weak, correlation between stakeholder participation in decision-making and project success (0.230). The relationship between stakeholder engagement and analysis and overall management is moderate (0.240 and 0.243, respectively). Stakeholder engagement, analysis, and communication all help to improve management techniques overall, but they have little direct effect on project success, which emphasises how complex good stakeholder management is.

Covariance

Covariances

	Communication with Stakeholders	Integration of Stakeholder Analysis into Management	Project Success	Stakeholder Analysis	Stakeholder Engagement	Stakeholder Involvement in Decision-Making	Stakeholder Management
Communication with Stakeholders	0.308	0.028	0.017	0.023	0.015	0.090	0.025
Integration of Stakeholder Analysis into Management	0.028	0.470	0.009	0.137	0.078	0.029	0.249
Project Success	0.017	0.009	0.343	0.023	0.022	0.063	-0.014
Stakeholder Analysis	0.023	0.137	0.023	0.416	0.060	0.030	0.113
Stakeholder Engagement	0.015	0.078	0.022	0.060	0.319	0.002	0.100
Stakeholder Involvement in Decision-Making	0.090	0.029	0.063	0.030	0.002	0.220	0.089
Stakeholder Management	0.025	0.249	-0.014	0.113	0.100	0.039	0.534

Figure 8. Covariance

The covariance matrix illustrates the degree to which each pair of variables in stakeholder management changes collectively. Stakeholder participation in decision-making and communication have a moderate correlation (0.090), indicating continuous co-variation. Stakeholder management and the integration of stakeholder analysis into management have a higher correlation (0.249), meaning that if one rises, the other rises as well. The success of the project reflects little shared variance, as evidenced by low covariance with most variables. Additionally, there are moderate covariances between stakeholder engagement and analysis and overall management (0.113 and 0.100, respectively). All things considered, these covariances indicate that better stakeholder management techniques are somewhat correlated with effective stakeholder communication, analysis, and involvement.

Descriptive

Descriptives

	Mean	Median	Observed min	Observed max	Standard deviation	Excess kurtosis	Skewness	Number of observations used	Cramér-von Mises test statistic	Cramér-von Mises p value
Communication with Stakeholders	3.576	3.600	1.600	5.000	0.555	0.761	-0.533	200.000	0.398	0.000
Integration of Stakeholder Analysis into Management	3.366	3.400	1.000	5.000	0.686	0.653	-0.305	200.000	0.212	0.004
Project Success	3.452	3.600	1.600	4.800	0.586	0.427	-0.670	200.000	0.489	0.000
Stakeholder Analysis	3.572	3.600	1.400	4.800	0.645	0.630	-0.525	200.000	0.325	0.000
Stakeholder Engagement	3.410	3.400	1.800	5.000	0.565	0.243	-0.220	200.000	0.313	0.000
Stakeholder Involvement in Decision-Making	3.736	3.800	2.200	4.800	0.469	0.695	-0.679	200.000	0.686	0.000
Stakeholder Management	3.190	3.200	1.000	5.000	0.731	-0.046	-0.251	200.000	0.335	0.000

Figure 9. Descriptive

The distribution and core tendency of the variables in stakeholder management are revealed by the descriptive statistics. Overall, moderate levels are indicated by the averages, which range from 3.190 (Stakeholder Management) to 3.736 (Stakeholder Involvement in Decision-Making). The means and medians are nearly equal, indicating symmetry. Low variability is indicated by the very small standard deviations; Stakeholder Management has the largest standard deviation, at 0.731. There is a little left skew, as indicated by negative skewness scores. With the exception of stakeholder management, excess kurtosis values are positive, indicating distributions with larger tails than a normal distribution. All of the variables have non-normal distributions, as shown by the significant p-values and test statistics for the Cramér-von Mises.

Quality criteria

R-square

R-square

Overview

	R-square	R-square adjusted
Project Success	0.066	0.037

Figure 10. R-square

The independent variables in the model account for roughly 6.6% of the variability in project performance, according to the R-square value of 0.066 for project success. Taking into consideration the number of predictors in the model, the modified R-square value of 0.037 indicates that only around 3.7% of the variance in project performance can be explained by the model when the number of variables is taken into account. These low R-square values imply that other factors not included in the model may be more important predictors of project performance as they show that the model does not significantly predict project success.

f-square

f-square

Matrix

	Communication with Stakeholders	Integration of Stakeholder Analysis into Management	Project Success	Stakeholder Analysis	Stakeholder Engagement	Stakeholder Involvement in Decision-Making	Stakeholder Management
Communication with Stakeholders			0.001				
Integration of Stakeholder Analysis into Management			0.000				
Project Success							
Stakeholder Analysis			0.002				
Stakeholder Engagement			0.000				
Stakeholder Involvement in Decision-Making			0.056				
Stakeholder Management			0.008				

Figure 11. f-square

The f-square matrix gives information about the effect sizes of predictor variables on the dependent variable, project success. Communication with Stakeholders has an f-square value of 0.001, indicating a negligible contribution to explained variance. The f-square score for integrating stakeholder analysis into management is 0.000, indicating that there is no demonstrable effect on project success. Stakeholder analysis likewise shows a low impact, with an f-square of 0.002. Similarly, Stakeholder Engagement has a small influence (f-square=0.006). Stakeholder Involvement in Decision-Making stands out with an f-square of 0.056, indicating a more apparent, but tiny, impact on project success. Finally, Stakeholder Management contributes minimally, with an f-square of 0.008.

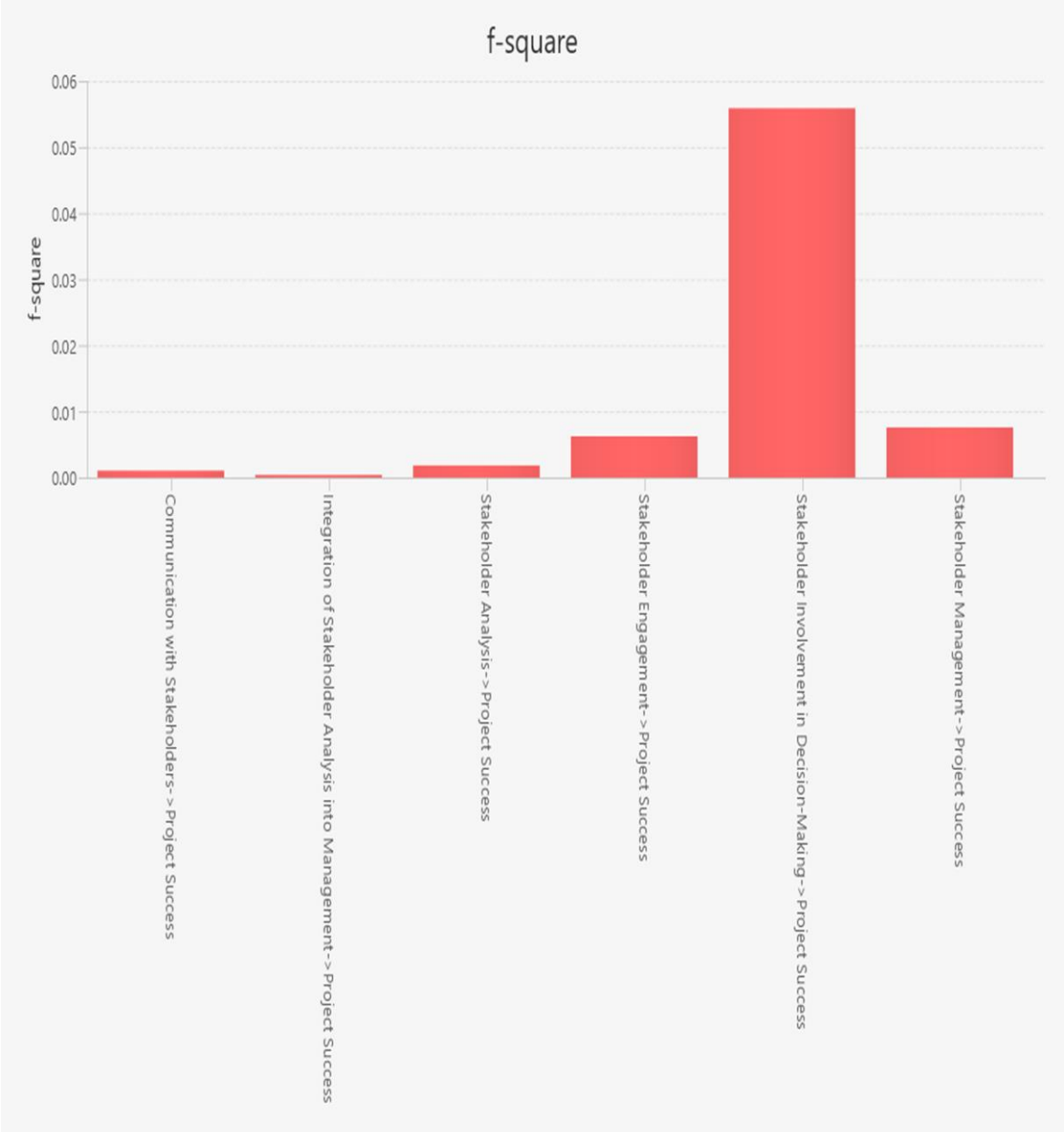


Figure 12. f-square

Overall, f-square values show that most variables have very little to negligible effects on project success, with Stakeholder Involvement in Decision-Making having the greatest impact among them.

Cronbach's alpha

Cronbach's alpha	
	Cronbach's alpha
Communication with Stakeholders	0.732
Integration of Stakeholder Analysis into Management	0.690
Project Success	0.675
Stakeholder Analysis	0.762
Stakeholder Engagement	0.456
Stakeholder Involvement in Decision-Making	0.754
Stakeholder Management	0.597

Figure 13. Cronbach's alpha

Cronbach's alpha is 0.732, indicating that communication with stakeholders is reliable. Integration of Stakeholder Analysis into Management has a little lower dependability of 0.690, which is close to the acceptable level. Project Success has moderate reliability, with an alpha of 0.675. Stakeholder Analysis has a strong reliability score of 0.762. Stakeholder Engagement has a low dependability coefficient (alpha = 0.456), indicating problems with internal consistency. Stakeholder Involvement in Decision-Making has a strong dependability score of 0.754. Stakeholder Management is moderately reliable, with a rating of 0.597.

Figure 14. Cronbach's alpha

Overall, while most constructs show acceptable to good dependability, Stakeholder Engagement falls significantly below the acceptable level, indicating potential problems with the scale employed to measure this construct.

Collinearity statistics (VIF)

Collinearity statistics (VIF)

Focal variables

	Communication with Stakeholders	Integration of Stakeholder Analysis into Management	Project Success	Stakeholder Analysis	Stakeholder Engagement	Stakeholder Involvement in Decision-Making	Stakeholder Management
Communication with Stakeholders			1.139				
Integration of Stakeholder Analysis into Management			1.408				
Project Success							
Stakeholder Analysis			1.133				
Stakeholder Engagement			1.084				
Stakeholder Involvement in Decision-Making			1.152				
Stakeholder Management			1.385				

Figure 15. VIF

The stakeholder engagement (1.084), the stakeholder analysis (1.133), the integration of stakeholder analysis into management (1.408), communication with stakeholders (1.139), stakeholder involvement in decision-making (1.522), and stakeholder management (1.385) are the VIF values. According to these values, the predictor variables appear to be sufficiently independent of one another, guaranteeing reliable and consistent regression estimations.

Algorithm

Algorithm

Setting

Data file

	Setting
Data file	Project Data

Path analysis

	Setting
Consider control variables	Yes
Data metric	Unstandardized

Execution log

Reading score matrix of complete data set

Calculating full data set.

Calculating report matrices and charts.

All calculations done.

Figure 16. Algorithm

The execution log for the path analysis of the "Project Data" dataset describes the actions followed throughout the process. Initially, the data file titled "Project Data" was read, and the analysis included control variables to account for other factors that could impact the outcomes. The study

was carried out using unstandardized data, which means that the raw data values were used in their original units without being scaled. The log describes how the analysis progressed, beginning with the reading of the complete dataset's score matrix, followed by computations on the entire dataset and the development of report matrices and charts. The process was successful, with all computations completed and appropriate reports created.

CONCLUSION

This study looked at the importance of stakeholder analysis and management in completing successful building projects. The study took a quantitative approach, with a survey issued to building experts. Stakeholder communication, analysis, engagement, decision-making participation, and management were all investigated in relation to project success. The findings revealed that, while stakeholder involvement in decision-making improves project effectiveness, other elements examined, such as communication, analysis, and management, had low or no effects. Surprisingly, stakeholder management had a negative connection with project outcomes. These findings indicate that existing stakeholder management strategies may be ineffectual or excessively control-oriented. These behaviours should be reevaluated in order to eliminate their negative impact on project outcomes. The study emphasises the value of active stakeholder interaction, particularly participation in decision-making processes. In addition, balanced communication methods and in-depth stakeholder analysis are critical for successful construction projects.

FUTURE IMPLICATIONS

Several limitations are mentioned in the study. The R-square score indicates that the model does not explain a significant percentage of the variance in project success, implying the presence of other unanalyzed components. Furthermore, the poor reliability coefficient for stakeholder participation suggests that there may be concerns with the survey's measurement scale. Future study is recommended to investigate these limitations. A broader set of variables influencing project success should be examined in order to create a more comprehensive model. Furthermore,

improving the measurement scales used to assess stakeholder engagement may increase the dependability of future investigations.

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