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Stakeholder Engagement and Operational Performance of Construction Firms in Rivers State, Nigeria

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Abstract

This paper investigates the impact of stakeholder engagement and operational performance of construction firms in Rivers State, Nigeria. To further understand operational performance, three measures including on-time delivery, project quality and cost minimization where used. This study was conducted in a non-contrived setting and the quasi-experimental research design method was adopted. A questionnaire was distributed to 121 study elements made up of managers and supervisors of eight selected construction firms with operational/regional offices in Port Harcourt, Rivers State, Nigeria. The retrieved and valid copies of the questionnaire were analyzed with the aid of the Statistical Package for Social Sciences (SPSS). The findings indicated that operational performance of construction companies in Port Harcourt, Rivers State, Nigeria as measured by on-time delivery, project quality and cost minimization is highly dependent on how engaged stakeholders of such a project are. Such engagement leads to high project quality, timely delivery of projects as well as cost reduction as stakeholders would have better understanding of the firm's operations. It is then concluded that stakeholder engagement is key to project success for construction companies operating in the Niger Delta, specifically Rivers State. Hence, managers and supervisors must deliberately

ensure that project stakeholders properly engaged all through the various stages of the project.

Keywords: Stakeholder engagement, Operational performance, On-time delivery, Project quality, Cost minimization, Construction, Niger Delta

Introduction

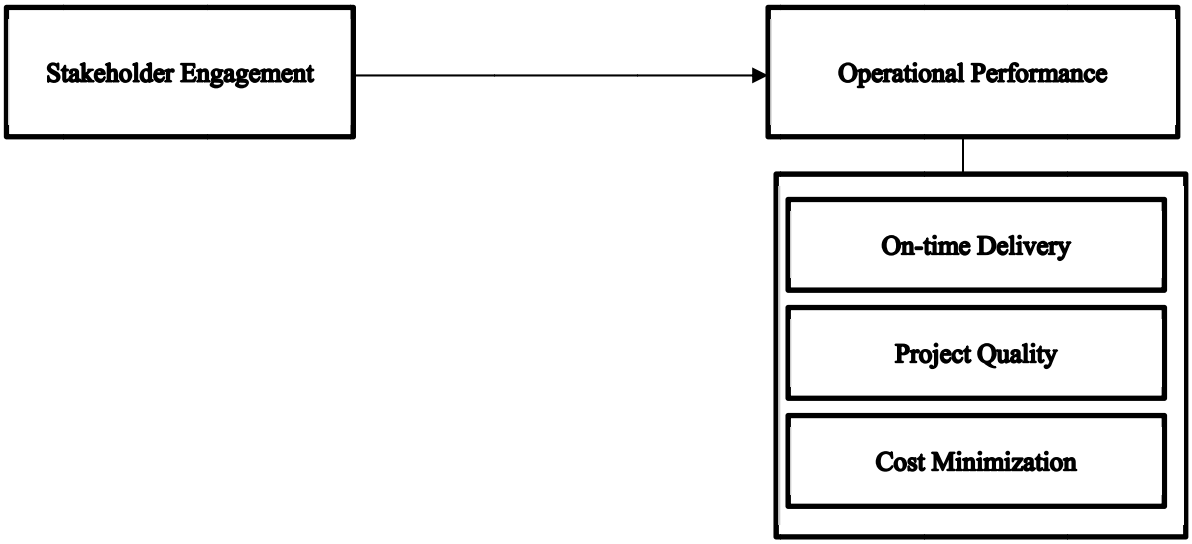
Stakeholder management as a concept is the term given to the system by which organisations pursue their set targets whilst considering the interests of its stakeholders (Freeman, 2004; Jackson, 2005). The practice of stakeholder management can aid firms gain current ideas on recent practices and innovation available at every given time when ideas are exchanged. For instance, a firm requires new technology from suppliers while at the same time it is the employees who will ensure that the new technology is accepted (Dzomonda, 2020). Hence, engaging and managing these stakeholders in order to acquire and harmonize working strategies to stay relevant is key to obtaining better operational performance. Building symbiotic relationships with stakeholders enables the firm to sustain its positive financial performance (Laughland & Bansal, 2011).

The principal argument of stakeholder engagement and management points to the fact that firms should be operated and managed in a way that will be to the interests of all their constituents who can affect or be affected by the achievement of the firm's objectives (Benson, Davidson, Wang & Worrell, 2011; Freeman, 1984). The main objective of stakeholder engagement is to increase the benefits that can be derived from stakeholders while reducing the possible negative impacts they could have on the firm (Landin, 2011). Stakeholder engagement generates a valuable and unique network of stakeholder relationships which lead to the acquisition of know-how and competencies forming corporate culture and giving rise to benefits for key stakeholders in the long run. Susniene and Purvinis (2015) argue that a firm interacting with its customers gathers experience and feedback from them, and based on the knowledge and the experience of the firm's customers, new and better core competencies can be found. At the same time, the employees are stimulated by these interactions and are motivated as they can deal with new ideas and satisfied customers (Rühli & Sachs, 2005). Additionally, the shareholders/investors as well benefit from this situation as the innovative solutions generated leads to a competitive advantage, as well as higher success.

According to Mathur, Price and Austin (2008), stakeholder involvement cannot be overemphasized in the context of project management and delivery, specifically in terms of stakeholder's engagement about the project and active participation in project design and delivery, so as to ensure project responsiveness to their peculiar needs and local conditions. Supporting this assertion, it is argued that a project is a unique process, comprising of a set of coordinated activities aimed at achieving objectives of conforming to specific requirements, with constrains of time, resources and cost (Olander, 2008; Bagshaw, 2019). The nature, uniqueness and limited duration of projects calls for additional efforts to develop effective project teams and build trust, both within the team and between the team and the project stakeholders (Grabher, 2002). The members of the team must quickly learn how to work together as a coherent unit (Ibrahim & Nissen, 2003). Managers of projects need to be familiar with the cultural, social, and organisational environments surrounding projects (Wideman, 1990 cited in Yang et al., 2010). Hence, for construction firms to operate efficiently in carrying out their construction projects, there is need to understand the project environment which includes the stakeholders. Stakeholders need to be involved in the planning, design and

construction phases in order to draw their inputs to achieve effective collaboration (El-Gohary, Osman & Ei-Diraby, 2006).

Therefore, this study empirically examined the impact of stakeholder engagement on the operational performance of construction firms in Rivers State, Nigeria; using on-time delivery, project quality and cost minimization as measures of operational performance.



Conceptual Framework reflecting both concepts

To achieve the aim of the study, the following null hypotheses were formulated:

Ho_1: There is no significant relationship between stakeholder engagement and on-time delivery of construction firms in Rivers State.

Ho_2: There is no significant relationship between stakeholder engagement and project quality of construction in Rivers State.

Ho_3: There is no significant relationship between stakeholder engagement and cost minimization of construction in Rivers State.

Literature Review

Theoretical Foundation: Stakeholder Theory

This section reviews the theoretical base on which this study hinges, which is the stakeholder theory as proposed by Freeman (1984). This theory is deemed most appropriate because it emphasizes that organisational success does not depend only on profit maximization, but also on meeting the expectations and needs of various stakeholders. Hence, organisational performance is highly dependent on its ability to manage relationships with diverse stakeholder groups.

Stakeholder theory by Freeman (1984) posits that an organisation is a social construction made of the interaction between various stakeholders in which organizations need to address

the interests of its set of stakeholders and persons who affect or are affected by the organization's activities. The organisation is envisioned as the center of a network of stakeholders, a complex system of exchanging services, information, influence and other resources (Freeman, 1984). Lepineux (2004) noted that organizations are responsible to several stakeholders, other than just shareholders; hence, a stakeholder is an individual or group which can influence or be influenced by the actions of a business. It includes employees, customers, suppliers, creditors and even the wider community and competitors. Nwaeke and Lebura (2016) have also viewed stakeholders from an industry perspective as anyone or group with an interest in an industry's success or failure, either because it can affect such an industry or be affected by the activities therein. It is important to add that such impact could be direct or indirect. The stakeholders' theory focused on the management and integration of the interests of shareholders, suppliers, distributors, employees, host communities, Government, customers, and other groups in such a manner that assures the organization's success in the long term. It is therefore concerned with the active management of the organization in relation to the satisfaction of interests of the entities that have stake in the organization.

Since Chan (2021) argues that organisations achieving success does not depend only on profit maximization but also on attending to the expectations and needs of various stakeholders. Hence, this paper explores stakeholder engagement and operational performance of construction firms in Rivers State, Nigeria; as to investigate how stakeholders can help influence their operational performance.

The Concept of Stakeholder Engagement

Stakeholder engagement is the process of involving stakeholders who may be affected by decisions or can influence the implementation of decisions (Urban Research Centre, 2008). Chinyio and Akintoye (2008) argue that stakeholder engagement is to communicate with, involve and develop relationships with stakeholders. However, stakeholders should be engaged as early as possible, and this has been considered to be essential for stakeholder analysis and decision making (Reed, 2008). Chinyio and Olomolaiye (2010) listed the different stakeholder engagement strategies as involvement, collaboration, consultation and informing.

Informing: This implies the provision of the stakeholders with balanced and objective information to assist them in understanding the problems alternatives and/or solutions. This level expresses minimal effort of stakeholder involvement in the project. External stakeholders with lower probability of impact and lower level of impact need to be kept informed of decisions taken that may affect them directly (Hammad, 2013). This seems to be the most basic level that just aims to ensure that stakeholders are in the know of what the organisation is doing at every point in time, especially in terms of how it impacts their lives and well-being.

Consulting: This takes stakeholder engagement to the next level, as it is achieved by obtaining stakeholders' feedback on alternatives on the decisions taken on the project. This is the way to keep stakeholders informed about the project. Consultation here entails that

stakeholders are consulted for their input in strategy formulation and implementation as these directly or indirectly affect them. It is unlikely that the strategy will be altered as a result of such consultation, but tactics may be well adjusted to maintain higher levels of commitment (Chinyio & Olomolaiye, 2010).

Involvement: This level refers to working directly with the stakeholders throughout the process to ensure that stakeholder concerns and aspirations are consistently understood and considered. Every stakeholder, irrespective of the probability of impact on the project execution needs to be involved in all activities in the project according to their interest on the project. This entails that management is inclined to work directly with these stakeholders to ensure that their concerns are consistently understood, considered, and reflected in the developed decision alternatives (Hammad, 2013).

Collaboration: This is partnering with stakeholders in each aspect of the decision-making process, given that key stakeholders have a high probability of providing the project with 'coalition of support' in planning and implementation. As such, stakeholders on the project should be treated as partners to increase their engagement and commitment (Hammad, 2013). This can be achieved by revising and tailoring project strategy, objectives, and outcomes if necessary to win their support (Savage, Nix, Whitehead & Blair, 1991). This level secures stakeholder partnership all through the different phases of the project, thereby ensuring that project delivery is not delayed or negatively impacted.

Ewurum (2018) further asserted that stakeholder engagement involves a range of activities such as informing people, listening to people, working with people, seeking input from people, bringing people together and empowering people. Based on the distinctiveness of the stakeholders that an organisation is faced with and the level of the threat they pose to the project outcomes; effective engagement is therefore a critical step to ensuring successful project outcomes. A research work was carried out by Keshkamat, Looijen and Zuidgeest (2016) to investigate how stakeholder involvement affects the performance of projects. The findings of the study indicated that one factor that influences the performance of the projects is stakeholder engagement. One benefit of stakeholder engagement is that it reduces the chances of resistance within and outside an organisation. Enabling high stakeholder engagement allows the stakeholders to express their views toward a particular project. The involvement also reduces conflict since each one involved with the project, either internally or externally, understands his or her responsibilities well.

The Concept of Operational Performance

Performance is the capability of a firm to attain its objectives and optimize results in a state of constant change (Miles, 2022). It refers to the action of performing a given task or set of tasks and it is measured on how successfully an individual or organized group performs such tasks (Hirebook, 2022). Effective performance is essential to businesses and it helps align the employees, resources, and systems to meet the firm's strategic objectives (Mckinsey & Company, 2017). Performance serves as a dashboard too, giving early warning of potential problems and allowing managers to know when they must make adjustments to keep a business on track.

According to Andriiuk (2021), operational performance can be best explained as the collaboration between various firm units and the ability to produce greater output together. In other words, it is the degree to which all the stakeholders on the project work together to accomplish specific objectives. Azim, Ahmed and Khan (2015) saw operational performance as the measurable aspects of the outcomes of a firm's processes such as production cycle time, reliability and inventory turns. Greene (2021) asserts that operational performance has become broadly welcomed as a critical success factor for firms across several industries, and is best described as the level at which all business units in an organisation work together in achieving the core business goals. For Schroeder, Shah and Xiaosong (2011), operational performance is the degree of achievement of the competitive priorities set by a firm. Neely, Gregory and Platts (2005) saw performance measurement as the process of quantifying the effectiveness and efficiency of action. Hence, the performance of the operation function serves as a measure of whether a company has realized its intended operations strategy or not (Flynn, Picasso & Paiva, 2013). Thus, operational performance is vital for assessing how well operations support the overall firm's goals.

Operational performance is the actual output obtained as measured against the intended output (Okoth, 2015). Enhancing operational performance has taken center stage for firms' transformational initiatives. Greene (2021) argued that innovative approaches, tools and technologies are helping firms to better perform with greater agility, flexibility and precision. Flynn et al. (2013); Schroeder et al. (2011) measured operational performance using quality, delivery performance, flexibility, and cost. Azim et al. (2015) listed production cycle time, reliability, inventory turns, operating cycle, fixed asset turnover, return on asset, and return on equity as measures of operational performance. The operational performance of an organisation was measured by Saraf (2019) as cost effectiveness, product innovation, on-time delivery, product performance, product quality and reliability.

On -Time Delivery: It is an essential aspect of supply chain management as it shows how well the firm can deliver goods on time, using planned resources, without any extra cost to the business. There are several performance sub-measures connected to delivery for example; on-time delivery (Katayama & Bennett, 1999; Garg, Narahari & Viswanadham, 2004; Bagshaw, 2015), delivery reliability (Garg et al. 2003; Rupp & Ristic, 2004; Michael & McCathi, 2005), faster delivery times (Bowersox, Stank & Daugherty, 1999; Liu, Zhang & Hu, 2005), delivery service, delivery frequencies (Katayama & Bennett, 1999), delivery synchronization (Lee & Whang, 2001), Order fulfillment lead time (Tannock et al., 2007), Supplier's delivery performance (Morgan & Dewhurst, 2008). Organisations must decide which of these sub-measures are most appropriate to measure, such as delivery from suppliers, delivery within their own organisation or delivery to customers. It actually shows whether or not an organisation is meeting its target in regards to promised delivery dates, making it critical for measuring carrier performance and maintaining customer satisfaction (Zahava, 2021). OptimoRoute (2021) defined on-time delivery as a key performance indicator (KPI) that businesses use to assess their ability to fulfill a customer order by the promised delivery date.

On the importance of on-time delivery, authors such as Dholakia and Zhao (2010) that found

out that on-time delivery has a significant effect on customer satisfaction. Also, Fan (2011) suggests that reducing the distance travelled by the distribution vehicles and increasing the service quality will increase the level of customer satisfaction in order to reduce costs in terms of transportation and delivery problems. A drop in on-time delivery rates turns an issue both to the customers (in the form of frustration, lack of trust in the brand) as well as for logistics operations. Zahava (2021) argues that even a single failed delivery attempt can have a domino impact on a firm and cause a delay in lead times for the rest of the orders delivered on the driver's run.

Project Quality: An organisation's operational performance could be measured using project quality. Quality is measured as the conformance to project specifications, capacity and performance (Neely et al., 2005). Project quality is the property of a project that satisfies the consumer; and it is the tangible and intangible attributes in the design of the project and its performance under normal use (Bagshaw, 2019). It is the ability of the project to fulfill what the end user wants and perceives as value (Bagshaw & Tarhuror, 2018). Firms may also evaluate project quality based on various perspectives that show how different groups perceive the usefulness of a product or project as in the construction industry. Project quality in its broadest sense is the capability of a project to meet or exceed the expectations of customers' (Waters & Waters, 2008). In today's competitive environment, quality is the key to business's survival and success. Intense global competition has highlighted the increasing benefits of quality. Superior quality no longer differentiates competitors; instead, it validates the worthiness of a company to compete (Hoe & Mansori, 2018).

If the output of their operations turns out to be of good quality, it could serve as a measure of how well their operation turns out. Project quality is vital because it impacts on the success of the project and aids in establishing its reputation in consumer markets. When an organisation can create high-quality products that continue to meet customer demands, it can lead to lesser production costs, higher investment returns and increases in revenue. In evaluating project quality, businesses consider several key factors, including whether a project solves a problem, works efficiently or suits customers' specifications.

Project quality helps businesses and firms establish brand recognition, earn customer loyalty and manage their costs. Customers often buy more from firms and businesses they know and trust, and firm can reduce costs regarding defects, product returns and losses. By ensuring product quality, you can help customers get to know your brand, encourage them to buy your products and increase your revenue (Indeed Editorial Team, 2021). Businesses can as well evaluate product quality based on various perspectives that show how different groups perceive the usefulness of a product or project. The perspectives to take into consideration when assessing product quality include manufacturing perspectives, customer perspectives, transcendental perspectives, product-based and value-based perspectives which perceive a product's value in relation to its cost.

Product quality is vital since it affects the success of the business and helps in establishing its reputation in customer markets. When firms can create high-quality products that continue to meet customer demands, it can lead to fewer production costs, higher investment returns and increases in revenue (Indeed Editorial Team, 2021). Product quality also matters to the

customers who depend on a company's attention to detail and customer demand. Construction companies create projects to fill a need in the market, and clients expect the projects to meet that need as the company advertises them. They want products that help them establish a connection with a brand so they know they can rely on the company's offerings.

Methodology

This study was conducted in a non-contrived setting and the quasi-experimental research design method was adopted. Again, the cross-sectional survey method was adopted for data collection which included the distribution and retrieval of copies of questionnaire from respondents. The population of the study is 8 selected construction companies with operational/regional administration offices in Port Harcourt, Rivers State, Nigeria. However, for the purpose of data collection copies of the questionnaire were sent to 121 managers and supervisors of the eight selected construction firms. Data analysis was undertaken with the aid of the Statistical Package for Social Sciences (SPSS).

Data Presentation and Analysis

The presentation and analysis of data in this section of the study involved the use of various statistics at three levels - primary, secondary and tertiary level. The primary level involved the analysis of the research instrument, and data with regard to respondents' demographics. At the secondary level, the univariate descriptive analysis was conducted using mean, standard deviation, skewness and kurtosis. The tertiary level analysis was concerned with showing the relationships between the independent variable and the dependent variables of the study decision.

Questionnaire Analysis

Table 1 indicates a summary of the copies of the instrument that were distributed and retrieved coupled with the ones that are usable.

Table 1. Response Rate for Questionnaire Administration

Description	Responses	Percentage (%)
Completely filled and returned	110	90.9%
Not properly filled but returned	8	6.6%
Not returned	3	2.5%
Total	121	100

Source: Field Work

Table 1 shows that the distributed questionnaire was 121 copies, out of which 110(90.9%) were completely filled and returned. Furthermore, the table revealed that 8(6.6%) were not properly filled but returned. However, 3(2.5%) copies were not returned. The data was analyzed using the Statistical Package for the Social Sciences (SPSS) version 27.0. The SPSS output contains frequencies, percents and pie charts concerning the demographic characteristics of the respondents (Pallant, 2013). Univariate analysis was employed to assess means and standard deviations of the observed variables to ascertain their level of manifestation within the firms. The structural model was assessed with the test of hypotheses

using composite Partial Least Squares (PLSc)-Path Modelling (PM), with the aid of ADANCO 2.3 (Henseler, Hubona, & Ray, 2016). The same data was used to assess the path coefficients (β), predictive accuracy (R^2), and the effect sizes (f^2) of stakeholders' engagement.

Justification for the use of Advanced Analysis of Composites (ADANCO 2.3)

This study employed ADANCO 2.3 technique for the following reasons:

(1) The latent variables for this study are computed as composites of the focal constructs (Henseler, et al., 2016). Moreover, the constructs are seen as linear combination of the indicators plus measurement errors.

(2) It allows for the measurement of multiple relationships simultaneously (Henseler, et al., 2016). It does not discriminate measurement scales and can be used whether the sample size is small or large (Fassott, Henseler & Coelho, 2016).

(3) It is particularly applicable to model latent variables (Henseler, et al., 2016).

Table 2. Cumulative descriptive statistics on the study variables

Latent Variable	N	Mean	Standard Deviation	Skewness (S_K)		Kurtosis (K_U)	
	Stat.	Stat.	Stat.	Stat.	Std. Error	Stat.	Std. Error
STE	110	2.53	0.89	1.30	0.82	1.25	0.97
OTD	110	2.57	0.58	-1.21	1.06	1.31	0.91
PRQ	110	2.66	0.85	0.85	0.86	0.86	0.62
COM	110	2.70	0.59	1.79	0.93	0.88	0.73

Source: Research Data (SPSS Output), 2023

Table 2 shows the cumulative descriptive statistics on the study variables, as it suggests that the construction firms are have moderate mean scores on stakeholders' engagement (M = 2.53, SD = 0.89), on-time delivery (M = 2.57, SD = 0.58), project quality (M = 2.66, SD = 0.85) and cost minimization (M = 2.70, SD = 0.59). Moreover, cost minimization recorded the highest mean score (M = 2.70, SD = 0.59), while stakeholders engagement (M = 2.53, SD = 0.89) recorded the lowest mean score.

Interpretation on Univariate Analysis

Majority of the respondents agree that involvement of stakeholders gives them a clear understanding of organisational goals, as stakeholders are given an opportunity to contribute their input on matters of change in the organisation and engaging directly with a stakeholder allows manufacturing firms gain a competitive advantage. However, few respondents are of the opinion that involvement of stakeholders ensures that the intended change is smooth and stakeholders' engagement builds trust between management and stakeholders. Furthermore, for on-time delivery, respondents perceive a low level of firm paying fast attention to customers' orders and responds speedily. Also, respondents perceive that there is a moderate extent to which customers receive products on time, the speed at which product gets to

customers makes them satisfied, order accuracy increases customers satisfaction and knowing that orders will be delivered fast builds up customers trust.

In the case of project quality, respondents perceived a moderate application of project quality, unique performance of products, product quality is the strongest determinant for the level of customers' satisfaction and product quality is a yard stick that gives an edge over competitors. Also, there is a low manifestation that the manufacturing firm's products quality attracts more customers. Furthermore, for cost minimization, respondents perceived a low commitment by the construction firms to eliminate unproductive processes and materials that increases cost. Also, respondents perceive a moderate involvement of the use of the right amount of labor and material, elimination of unproductive processes, diligently tracking expenses and ensuring employees comply with cost minimization.

Assessment of Structural Model and Test of Hypotheses

The PLS-SEM process requires that the structural model should be evaluated once the measurement model is established to be free from reliability and validity issues. The stage for assessment of structural model involves testing the hypotheses, evaluation of predictive accuracy through the coefficient of determination (R^2), assessment of the predictive relevance (Q^2) of the independent variable, and the calculation of effect sizes (Cohen's f^2) of the dimensions of the independent variable. The emergent t-values were also estimated. This serves as justification for rejecting or accepting the null hypotheses.

Cohen (1988) reported that path coefficients (β values) of 0.10 to 0.29, 0.30 to 0.49; and 0.50 to 1.0, represent weak, moderate, and strong correlations respectively. Furthermore, for a two tailed test, t values above 1.96 are significant, while t values below 1.96 are not (Hair et al., 2014). As a result, if the t-value for a two-tailed test is above 1.96, the null hypothesis is rejected. Three hypotheses were tested.

Table 3 shows the results, as reflected in path relationships, path coefficients, standard errors and t-statistics.

Table 3. Results of Hypotheses Testing

Null Hypothesis	**Path (Relationship)**	**Path Coefficient (β)**	**Standard Error**	***t*-Statistic**	**Decision**
H_{O1}:	STE -> OTD	0.342	0.153	3.116	Rejected
H_{O2}:	STE -> PRQ	0.275	0.074	3.312	Rejected
H_{O3}:	STE -> COM	0.309	0.092	3.141	Rejected
Note: STE = Stakeholders Engagement; **OTD** = On-time Delivery; **PRQ** = Product Quality; **COM** = Cost minimization					

Source: ADANCO 2.3 output on research data, 2023

The first hypothesis states that:

H_{O1}: There is no significant relationship between stakeholders' engagement and on-time delivery of construction firms in Rivers State.

Figure 1 shows the path model on the relationship between stakeholders' engagement and on-time delivery.

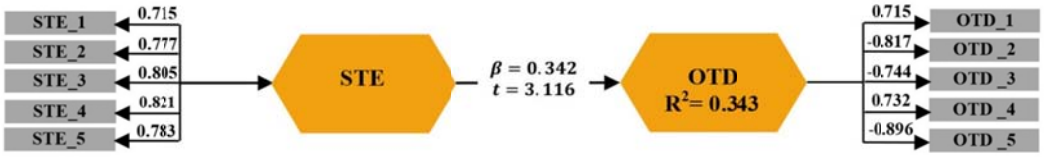


Figure 1. Path Model of Stakeholders' Engagement and On-Time Delivery

The path relationship analysis presented in Table 3 and figure 1 indicate that there is a moderate, positive and significant paths between stakeholder engagement and on-time delivery ($\beta = 0.342$, $t = 3.116$). Therefore, H_{O1} was rejected.

The second hypothesis states that:

H_{O2}: There is no significant relationship between stakeholders' engagement and project quality of construction firms in Rivers State.

Figure 2 shows the Path Model on the relationship between stakeholders' engagement and project quality.

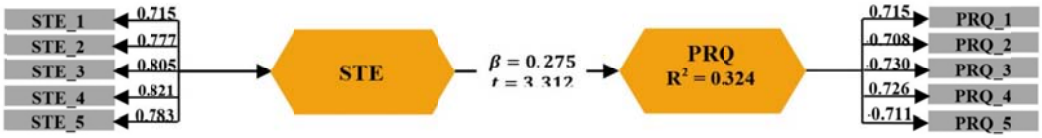


Figure 2. Path Model of Stakeholders' Engagement and Project Quality

The path relationship analysis presented in Table 3 and figure 2 indicated that there a moderate, positive and significant path between stakeholder engagement and product quality ($\beta = 0.275$, $t = 3.312$). Therefore, H_{O2} was rejected.

The third hypothesis states that:

H_{O3}: There is no significant relationship between stakeholders' engagement and cost minimization of construction firms in Rivers State.

Figure 3 shows the Path Model on the relationship between stakeholders' engagement and cost minimization.

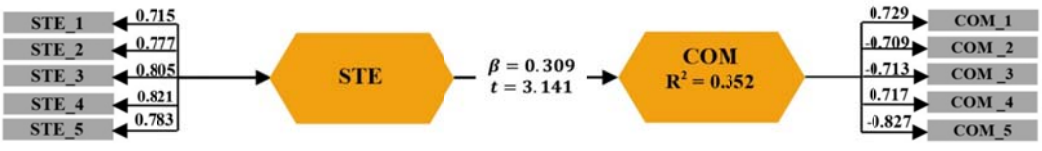


Figure 3. Path Model of Stakeholders' Engagement and Cost Minimization

Assessment of Predictive Accuracy (R^2)

The R-squared (R^2) statistic displays the cumulative influence of the dimensions of an independent variable on a selected dependent variable. It's a metric for how well the model predicts accuracy (Hair et al., 2014). The R^2 values can range from 0.00-1.00, with 1.00 representing complete predictive accuracy (Henseler et al. 2009; Sarstedt, Ringle & Hair, 2017). According to Henseler et al. (2009), an R^2 value with 0.00-0.25, 0.26-0.50 and 0.51-0.75 signifies weak and moderate, substantial levels of predictive accuracy, respectively. However, Chin (1998) submitted that R^2values of 0.00-0.19, 0.20-0.33 and 0.34-0.67 as weak, moderate and substantial.

Furthermore, it is established that when the dimensions of an exogenous variable increase, R^2 scores rise-even if the additional dimensions have no statistical significance for the endogenous variable. It means that R-squared incorrectly assumes that every dimension of the model's exogenous variable adequately explains the variation in the endogenous variable. To atone for the limitation of R^2, a related statistic known as "R^2-adjusted" is used to calculate the percentage variation elucidated by only the independent variables that have an effect on the dependent variable. Despite the fact that the adjusted R^2 statistic is evaluated in the same way as the traditional R^2, it sometimes records a lower value (rather than a higher) than R^2.

Table 4 is the PLS-SEM in ADANCO bootstrapping output of R^2 and Adjusted R^2 values of the dependent variable.

Table 4. Results of Predictive Accuracy R^2 and Adjusted R^2

Exogenous Variable	Endogenous Variables	Predictive Accuracy (R^2)	Adjusted R^2
STE	OTD	0.343	0.341
STE	PRQ	0.324	0.322
STE	COM	0.352	0.353
Note: STE = Stakeholders Engagement; OTD = On-time Delivery; PRQ = Project Quality; COM = Cost minimization.			

Source: ADANCO 2.3 output on research data, 2023

Table 4 indicates that the model OTD = *f*(STE) recorded a moderate and positive R^2 of 0.343. This means that stakeholders' engagement explains 34.3% of the variance of on-time delivery, while other unexplainable variables are responsible for the remaining 65.7%. Thus, the model has a moderate predictive accuracy; that stakeholders' engagement moderately predicts the on-time delivery of construction firms in Rivers State.

Also, Table 4 indicates that the model PRQ = *f*(STE) recorded a weak and positive R^2 of 0.324. This means that stakeholders' engagement explains 32.4% of the variance of project quality, while other unexplainable variables are responsible for the remaining 67.6%. Thus, the model has a weak predictive accuracy; that stakeholders' engagement weakly predicts the project quality of construction firms in Rivers State.

Furthermore, table 4 indicates that the model COM = *f*(STE) scored a moderate and positive R^2 of 0.352. This means that stakeholders' engagement explains 35.2% of the variance of operational performance, while other unexplainable variables are responsible for the remaining 64.8%. Thus, the model has a moderate predictive accuracy; that stakeholders' engagement moderately predicts the operational performance of construction firms in Rivers State.

Assessment of Predictive Relevance (Q^2)

Geisser (1974) opined that the non-parametric Q^2 test, also known as Stone-Geisser's test, is used to determine the predictive relevance of the independent variable. According to Esposito Vinzi et al. (2010), it is can be used in place of goodness-of-fit evaluation that determines whether the observed variables can be re-assessed by the model while maintaining a fit with the parameter estimates.

To estimate residual variances, a cross-validated redundancy blindfolding approach was employed with an omission distance of 7 in the data matrix (Tenenhaus, Esposito Vinzi, Chatelin & Lauro, 2005). In general, an independent variable with a Q^2 value greater than zero (>0) or a positive value indicates that the predictor is significant to the model (Fornell & Cha, 1994; Hair et al., 2014). Table 5 shows the output for predictive relevance ascertained through a cross-validated redundancy blindfolding method, with an omission distance of 7.

Table 5. Construct Cross-validated Redundance (Q^2)

Latent Variables	**SSO**	**SSE**	**Q^2=1-SSE/SSO**	**Remark**
STE	1372. 000	1372. 000		
OTD	**1372. 000**	**1158. 172**	**0.1559**	**Satisfactory**
STE	1281. 120	1281. 120		
PRQ	**1281.120**	**1201.612**	**0.0623**	**Satisfactory**
STE	1217. 340	1217. 340		
COM	**1297. 340**	**1203. 255**	**0.0725**	**Satisfactory**
Note: STE = Stakeholders' Engagement; **OTD** = On-time Delivery; **PRQ** = Project Quality; **COM** = Cost minimization. Q^2= Predictive Relevance; **SSE**= Sum of Squares of Prediction Errors; **SSO** = Sum of Squares of Observations. **Reference value:** Q^2> 0 = satisfactory predictive relevance (Hair et al., 2014).				

Source: ADANCO 2.3 output on research data, 2023

Table 5 indicates that the components of exogenous latent variables present a non-negative cross-validated redundancy index (Q^2 = 0.1559>0) for model OTD = *f*(STE). Also, the exogenous latent variables scored a non-negative cross-validated redundancy index (Q^2 = 0.0623>0) for model PRQ = *f*(STE). Furthermore, the exogenous latent variables scored a non-negative cross-validated redundancy index (Q^2 = 0.0725>0) for model COM = *f*(STE).

This implies that all paths of the hypothesized models accurately anticipate the observed values. As a result, stakeholders' engagement is important in predicting operational performance, which is measured in terms of on-time delivery, project quality and cost minimization.

Assessment of Effect Sizes (f^2)

Effect size (f^2) is a number that estimates the intensity of the relationship between two variables (Kelley & Preacher, 2012). The effect size describes the magnitude of a direct effect. It can have values that are either larger than or equal to zero (Henseler et al. (2009),). Cooper (2020) averred that effect size can be employed in power analysis and sample size estimates, and complements null hypothesis significance testing (NHST). Cohen (1988) and Gefen et al. (2000), in the interpretation of effect size f^2, submitted that (f^2) of 0.02 = small; 0.15 = medium, while 0.35 = large effect. In addition, effect size below 0.02 is implies a zero (unsubstantial) effect. The effect size of each path in the model was evaluated by means of Cohen's f^2 (Cohen, 1988).

Mathematically, effect size (f^2) = $\frac{R^2_{variablepresent} - R^2_{variableabsent}}{1 - R^2_{variablepresent}}$

Table 6 shows the effect size of stakeholders' engagement on the measures of the dependent variable of the study. Table 6 also includes the effect size of the independent variable on the accumulated dependent variable.

Table 6. Effect Size of the exogenous variables on the endogenous variables

Endogenous Variable	Exogenous Variable	R-Squared Present	R-Squared Absent	f^2 - effect size	Remark on Effect Size
OTD	STE	0.343	0.156	0.2846	Medium
PRQ	STE	0.324	0.167	0.2322	Medium
COM	STE	0.352	0.128	0.3457	Medium
Note: STE = Stakeholders Engagement; **OTD** = On-time Delivery; **PRQ** = Project Quality; **COM** = Cost minimization. Reference values: f^2 less than 0.020 = no effect; f^2, 0.020 = small effect; f^2, 0.15 = medium effect; f^2, 0.35 = large effect (Cohen,1988).					

Source: ADANCO 2.3 output on research data, 2023

Table 6 indicates that stakeholders engagement has medium effect on on-time delivery (f^2 = 0.2846), project quality (f^2 = 0.2322) and cost minimization (f^2 = 0.3457).

Interpretation of Multivariate Output

This section is based on the interpretation of results concerning multivariate data analysis, where three hypotheses were analyzed. The tables present the results of each of hypothesis. Table 7 is a summary concerning result on the accumulated model, while Table 8, Table 9 and Table 10 are summaries concerning results on tests of hypotheses H_{O1}, H_{O2} and H_{O3}, respectively. These tables are used to interpret the results of the multivariate analysis.

As earlier stated, Table 7 shows the relationship between stakeholders' engagement and the accumulated form of operational performance.

Table 7. Summary of Result on aggregated model

Endogenous Variable (Aggregated)	Exogenous Variable	Path Coefficient (β), (t –value)	Predictive Accuracy R^2	Effect Size-f^2	Predictive Relevance -Q^2
ORP	STE	0.381(2.002) Significant	0.357 Moderate	0.3705 Large	0.0797 Satisfactory

Note: STE = Stakeholders' Engagement; **ORP** = Operational Performance. **Reference values:** β values: 0.10 to 0.29, 0.30 to 0.49 and 0.50 to 1.0 are weak, moderate and strong correlations, respectively (Cohen, 1988). R^2: 0.19, 0.33 and 0.67 signify weak, moderate and substantial, respectively (Chin, 1998; Henseler, et al., 2009). **Effect Size (f^2)**: < 0.020, 0.020, 0.15, 0.35 signify no effect, small effect, medium effect, large effect, respectively (Cohen 1988). Q^2: > 0 or positive suggests that the predictor is relevant (Hair et al. 2011).

Source: ADANCO 2.3 output on research data, 2023

The aggregated model, as seen in Table 7, indicated that stakeholders' engagement has a moderate positive and significant relationship with the aggregated form of operational performance. Specifically, 38.1% change in operational performance is associated with a unit change in stakeholders' engagement. Moreover, the R^2 value indicates that a unit increase in stakeholders' engagement will amplify operational performance by 35.7%. This means that the more the construction firms engage relevant stakeholders, the more likely they are to meet their goals. In addition, the aggregated model suggests that stakeholders' engagement has a large effect size. Thus, the propensity of the construction firms to engage directly with a stakeholder, is the major reason their set goals is achieved. Furthermore, the aggregated model suggests that stakeholders' engagement is significant in predicting operational performance, and as such managers can use the model to make decisions.

Stakeholders' Engagement Practices and On-time Delivery

The first hypothesis $\mathbf{H_{O1}}$ is stated thus:

$\mathbf{H_{O1}}$: There is no significant relationship between stakeholders' engagement and on-time delivery of construction firms in Rivers State.

Table 8 indicates the test output of hypothesis $H_{O1.}$

Table 8. Summary of Result on the Test of Hypotheses H_{O1}

Null Hypothesis	Path (Relationship)	Path Coefficient (β), (t –value)	Predictive Accuracy R^2	Effect Size- f^2	Predictive Relevance –Q^2	Decision
H_{O1}:	STE -> OTD	0.342(3.116) Significant	0.343 Moderate	0.2846 Medium	0.1559 Satisfactory	Rejected

Note: STE = Stakeholders' Engagement; **OTD** = On-time Delivery. **Reference values:** β values: 0.10 to 0.29, 0.30 to 0.49 and 0.50 to 1.0 are weak, moderate and strong correlations, respectively (Cohen, 1988). R^2: 0.19, 0.33 and 0.67 signify weak, moderate and substantial, respectively (Chin, 1998; Henseler et al., 2009). **Effect Size** (f^2): < 0.020, 0.020, 0.15, 0.35 signify no effect, small effect, medium effect, large effect, respectively (Cohen 1988). Q^2: > 0 or positive suggests that the predictor is relevant (Hair et al. 2011).

Source: ADANCO 2.3 output on research data, 2023

Table 8 shows that there is a moderate predictive accuracy of stakeholders' engagement on on-time delivery. In particular, the table suggests that a unit increase in stakeholders' engagement will predict an increase on on-time delivery by a little more than about one-thirds (34.3%). Moreover, a little less than two-thirds (65.7%) are due to other factors that are not captured by the model. This means that the construction firms will engage the relevant stakeholders for the purpose of achieving pre-planned and acceptable outcomes. Thus, after building a theoretical foundation, it's possible that further variables will need to be added to boost the model's explanatory ability.

Moreover, the model indicates a satisfactory predictive relevance on the relationship between stakeholders engagement on on-time delivery. This means that, the present level at which construction firms build trust between management and stakeholders, will to a large extent, increase the speed at which projects are completed for clients and satisfy them by receiving projects based on on-time delivery.

The first hypothesis H_{O1} states that "there is no significant relationship between stakeholders' engagement and on-time delivery of construction firms in Rivers State." Table 8 reports that stakeholders' engagement (STE) has a moderate, positive, and significant relationship with on-time delivery (OTD). Therefore, H_{O1} was rejected. This means that the more the construction firms engage relevant stakeholders for the purpose of achieving pre-planned and acceptable outcomes, the more will they have higher levels of finished projects and deliveries made on time. Furthermore, the model reveals a medium effect size assigned to stakeholders' engagement (STE).

Thus, the main reason strategic management practices accounts for variation in on-time delivery of construction firms is due to giving stakeholders an opportunity to voice their input on matters of change in the organisation, build trust between management and stakeholders and engaging directly with a stakeholder in order to learn not only their perspective, but can provide new insights on a project to gain a competitive advantage.

Based on the aforementioned, the specific finding is:

Stakeholders' engagement amplifies on-time delivery. This means that the more the

construction firms engage relevant stakeholders for the purpose of achieving pre-planned and acceptable outcomes, the more they are likely to achieve higher levels of finished projects and timely deliveries. This could be attributed to the cooperation of the various stakeholders being secured, as a result of the engagements undertaken by the company thereby leading to smooth and speedy operations in the course of projects implementation and delivery.

Stakeholders' Engagement and Project Quality

The second hypothesis comprises **H_{O2}** stated thus:

H_{O2}: There is no significant relationship between stakeholders' engagement and project quality of construction firms in Rivers State.

Table 9 indicates the test output of hypothesis $H_{O2.}$

Table 9. Summary of Result on the Test of Hypotheses H_{O2}

Null Hypothesis	Path (Relationship)	Path Coefficient (β), (t – value)	Predictive Accuracy R^2	Effect Size- f^2	Predictive Relevance -Q^2	Decision
H_{O2}:	STE -> PRQ	0.275(3.312) Significant	0.324 Moderate	0.2322 Medium	0.0623	Rejected

Note: STE = Stakeholders' Engagement; **PRQ** = Project Quality. **Reference values:** β values: 0.10 to 0.29, 0.30 to 0.49 and 0.50 to 1.0 are weak, moderate and strong correlations, respectively (Cohen, 1988). R^2: 0.19, 0.33 and 0.67 signify weak, moderate and substantial, respectively (Chin, 1998; Henseler et al., 2009). **Effect Size (f^2)**: < 0.020, 0.020, 0.15, 0.35 signify no effect, small effect, medium effect, large effect, respectively (Cohen 1988). Q^2: > 0 or positive suggests that the predictor is relevant (Hair et al. 2011).

Source: ADANCO 2.3 output on research data, 2023

Table 9 shows that there is a moderate predictive accuracy of stakeholders' engagement on project quality. In particular, the table suggests that a unit increase in strategic management practices will predict an increase on project quality by a little less than one-thirds (32.4%). Moreover, a more less than two-thirds (67.6%) are due to other variables that are not captured by the model. This means that project quality will be reduced by about one-thirds when the construction firms make a unit improvement in ascertaining the stakeholders before the commencement of a project. After creating a theoretical foundation, it could be concluded that more variables should be incorporated to boost the explanatory power of the stakeholders' engagement -project quality model.

Moreover, the model indicates a satisfactory predictive relevance on the relationship between stakeholders engagement on project quality. This means that the present level at which construction firms engage stakeholders as a means to build trust will, to a large extent, enhance project quality. Thus, supporting the view that the project quality and operations in construction firms will be better satisfied by how managers help to generate more valuable engagements to improve healthy workplace culture.

The second hypothesis (H_{O2}) states that "there is no significant relationship between stakeholder engagement and project quality of construction firms in Rivers State." Table 9 reports that stakeholder engagement (STA) has a moderate, positive and significant relationship with project quality (PRQ). Therefore, H_{O6} was rejected. This means that the more the construction firms use the right amount of labor and material as a means to reduce cost of production, eliminate unproductive processes and materials, tracking expenses diligently and ensure employees comply, the more project quality will be developed.

Moreover, the model reveals a medium effect size attributed to stakeholders' engagement (STE). Thus, much of the reason stakeholders' engagement accounts for variation in the project quality and operations of construction firms is because they involve stakeholders which give a clear understanding of organisational goals, give stakeholders an opportunity to air in their input on matters of change in the organisation, engaging directly with a stakeholder which enables trust between management and stakeholders.

Based on the aforementioned, the specific finding is:

Stakeholders' engagement aids the improvement of project quality. This means that the more the construction firms make use of the right amount of labour and material as a means to reduce cost of production, eliminate unproductive processes and materials, tracking expenses diligently and ensure employees comply, the more project quality will be improved.

Stakeholder Engagement and Cost minimization

The third hypotheses **H_{O3}** stated thus:

H_{O3}: There is no significant relationship between stakeholder engagement and cost minimization of construction firms in Rivers State.

Table 10. Summary of Result on the Test of Hypotheses H_{O3}

Null Hypothesis	Path (Relationship)	Path Coefficient (β), (t –value)	Predictive Accuracy R^2	Effect Size- f^2	Predictive Relevance -Q^2	Decision
H_{O3}:	STE -> COM	0.309(3.141) Significant	0.352 Moderate	0.3547 Medium	0.0623 Satisfactory	Rejected

Note: STE = Stakeholder Engagement; **COM** = Cost minimization. **Reference values:** β values: 0.10 to 0.29, 0.30 to 0.49 and 0.50 to 1.0 are weak, moderate and strong correlations, respectively (Cohen, 1988). R^2: 0.19, 0.33 and 0.67 signify weak, moderate and substantial, respectively (Chin, 1998; Henseler et al., 2009). **Effect Size (f^2)**: < 0.020, 0.020, 0.15, 0.35 signify no effect, small effect, medium effect, large effect, respectively (Cohen 1988). Q^2: > 0 or positive suggests that the predictor is relevant (Hair et al. 2011).

Source: ADANCO 2.3 output on research data, 2023

Table 10 indicates the test output of hypotheses H_{O3}, as it shows that there is a moderate predictive accuracy of stakeholder engagement on cost minimization. In particular, the table suggests that a unit increase in stakeholder engagement will predict an increase on cost minimization by a little less than one-third (35.2%). Moreover, a more less than two-thirds (64.8%) are due to other variables that are not captured by the model. This means that cost

minimization will be achieved by about one-third when the construction firms make a unit improvement in engaging relevant stakeholders for the purpose of achieving pre-planned and acceptable outcomes. After creating a theoretical foundation, it could be concluded that more variables should be incorporated to boost the explanatory power of the stakeholder engagement - cost minimization model.

Moreover, the model indicates a satisfactory predictive relevance on the relationship between stakeholder engagement and cost minimization. This means that the more the construction firms engage stakeholders in order to enhance operations, one outcome to be enjoyed from such cordial relationship will be cost-effectiveness in project delivery. It is important to add here that this will not be at the detriment of the expected quality of such jobs, especially considering that the stakeholders who will be the primary users of these projects will not want substandard projects. This further supports the view that cost minimization in the construction firms will be better achieved, depending on how well managers can undertake as well as leverage on stakeholder engagement. The third hypothesis (H_{O3}) states that "there is no significant relationship between stakeholder engagement and cost minimization of construction firms in Rivers State". Table 10 reports that stakeholder engagement has a moderate, positive and significant relationship with cost minimization. Therefore, H_{O3} was rejected. This means that the more the construction firms engage relevant stakeholders for the purpose of achieving pre-planned and acceptable outcomes, the more cost will be minimized.

Conclusion

This study examined the causal relationship between stakeholder engagement and operational performance of construction firms in Rivers State, Nigeria. The findings of this study are based on the outputs from the quantitative analyses of the data. In tandem with the aim of the study, the main conclusion is drawn based on the perception of construction firm managers in Rivers State, Nigeria about stakeholder engagement and its relationship with their operational performance.

It was found that stakeholder engagement enhances operational performance of construction firms in Rivers State, Nigeria. Stakeholder engagement has significant positive effect on-time delivery. This means that the more construction firms in Rivers State, Nigeria engage relevant stakeholders for the purpose of achieving pre-planned and acceptable outcomes, the more they will have higher levels of finished projects and deliveries made on time.

Again, stakeholder engagement has significant positive effect on project quality. This means that the more construction firms in Rivers State, Nigeria use the appropriate mix of labour and material in execution of projects, eliminate unproductive processes and materials, tracking expenses diligently, the more the project quality will be improved, while also maximizing resources in terms of cost minimization.

Recommendation

Managers of construction firms must first appreciate that every project that they undertake is first about the users who are also part of the stakeholders of such projects. As a result, they must take stakeholder engagement seriously and intentionally make it part of their strategic planning for timely delivery and improved quality of projects as well as resource

maximization via cost minimization. In doing this, all stakeholders must be identified and engaged all through the various phases of the project, no matter how insignificant they may be seen to be. This builds their confidence and trust, thereby leading to securing their buy-in knowing that every project is meant to improve their wellbeing in one way or the other.

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