PROJECT FINANCING REQUIREMENTS AND PROJECT DELIVERY DELAY IN THE NIGERIAN CONSTRUCTION INDUSTRY: MODERATING ROLE OF FINANCIAL AVAILABILITY AWARENESS

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Abstract

Construction delays ravage economies, disrupt societies, and harm environments. In Nigeria, infrastructure growth hinges on timely project delivery, yet financing hurdles and awareness gaps affect construction project delivery. Therefore, this study examines the moderating role of financial availability awareness on the relationship between project financing requirements and project delivery delay in the Nigerian construction industry. Using a survey research design and Partial Least Squares Structural Equation Modeling (PLS-SEM), the study analyzes primary data from 423 construction project stakeholders in Kaduna State. Findings of the study revealed that increases in project financing requirements can lead to significant increases in project delivery delay. Financial availability awareness was found to play a crucial role in mitigating the impact of project financing requirements on project delivery delay, accounting for 50% of the variation in project delivery delay. The study emphasizes the importance of effective project financing awareness and judicious project financing strategies in reducing project financing requirements and mitigating project delivery delays. To minimize delays and ensure successful project outcomes, construction stakeholders must prioritize financial availability awareness, explore alternative financing options, and develop robust financial management plans. Policymakers and regulatory bodies should establish frameworks that promote financial awareness, transparency, accountability, and competitiveness in the construction financing market.

Keywords: cost effective project financing, construction industry, effective project delivery, financial availability awareness, project financing requirements, project delivery delays

Introduction

Infrastructural development projects undertaken by the construction industry play a vital role in achieving economic progress, national development, and sustainability (Ajayi, Oyedele & Akinade, 2020). These projects, such as transportation infrastructure (e.g., roads, highways, airports, and seaports), energy infrastructure (e.g., power plants, transmission lines, and distribution networks), and water and sanitation infrastructure (e.g., water treatment plants, pipelines, and sanitation facilities) and educational infrastructures have a significant impact on a country's economic growth, social development, and environmental sustainability (Ogunmakinde, Maboudou-Tchao & Akinradewo, 2022). Effective project financing is crucial for the successful delivery of these projects, enabling regional and national governments, contractors, developers and other important construction project stakeholders to effectively access necessary funds, manage risks, and ensure timely completion (Ibidunni, Ogunlana & Afolabi 2022).

Infrastructural development projects in Nigeria heavily rely on budgetary allocations from the national government, which often leads to project delivery delays (Ogunmakinde, Maboudou-Tchao & Akinradewo, 2022). The government's budgetary allocations are often insufficient, resulting in delays and abandonment of projects with Nigeria loosing approximately N3 trillion annually due to delays in infrastructure project delivery (Ajayi, Oyedele & Akinade, 2020). The Nigerian Infrastructure Stock Company (NISC) reported that the country requires approximately N36 trillion to complete ongoing infrastructure projects across the

six geopolitical zones of the country. To reduce sole dependency on budgetary allocation for infrastructural development projects and its consequential effect, Nigerian government adopted debt financing strategy in additional to the traditional budgetary allocations utilizing supplementary financing through foreign and domestic borrowing to support capital projects (Ango, 2022). According to Adeleke, Olawumi & Owolabi (2022), National Development Banks, multilateral corporations and institutional investors play a significant role in financing infrastructure development projects, collaborating with private partners to raise resources, provide expert advice to governments, reducing construction project delivery delay and support growth of the economy.

Construction project financing demands a comprehensive strategy, encompassing forecasting, budgeting, and fund procurement, as well as efficient resource allocation to ensure timely and cost-effective project delivery (Adamu & Idris, 2024). Innovative financing strategies, such as public-private partnerships and infrastructure concessions can help mitigate delivery delays by leveraging debt or equity financing options from a diverse range of stakeholders (Chen, Zhang & Li, 2020). The private sector has emerged as a crucial player in bridging infrastructure funding gaps, with financial institutions, multilateral corporations, and institutional investors providing critical financing through various instruments, particularly in the face of public budget constraints (Gatti, 2015). When providing medium- to long-term financing for construction projects, commercial banks, multilateral corporations, and institutional investors typically assess project feasibility and viability while considering collateral requirements and interest rates as financing requirements (Kirubel, 2023; Ofori *et al.*, 2017).

Kirubel (2023) highlighted the significance of financial availability awareness (availability of information on who offers construction project debt or equity financing, provision of information on construction project financing mechanisms and how past experience of project stakeholders in obtaining successful project financing affect financing awareness) in shaping project delivery outcomes. Nonetheless, the Nigerian construction industry lacks considerable insight into how financial availability awareness influences the relationship between project financing requirements and project delays. This study seeks to fill this knowledge gap by examining the moderating role of financial availability awareness on the relationship between project financing requirements and project delivery delay in the Nigerian construction

Literature Review

Theoretical Framework

This research delves into the complex interplay between project management and project finance, with a specific focus on construction project delivery delays. Grounded in expectancy theory (Vroom, 1964), this study seeks to elucidate the impact of financing requirements on construction project delivery delays and to investigate the moderating influence of financial availability awareness on this relationship. Financial availability awareness encompasses availability of information on who offers construction project financing, knowing construction project financing mechanisms and the effects of past experiences on financing awareness.

Expectancy Theory

The Expectancy Theory, first introduced by Vroom (1964), offers a valuable framework for understanding the motivational drivers of individual behavior. This theory suggests that motivation is shaped by two critical factors: expectancy, which pertains to the perceived likelihood of achieving a desired outcome, and valence, which refers to the value attributed to that outcome (Snead & Harrel, 1994). Initially applied to organizational contexts, expectancy theory has undergone significant refinements and extensions, informing decision-making on organizational objectives, strategy, and supplier development (Fudge & Schlachte, 1999; Chen & Fang, 2008; Wood, Logar & Riley, 2005; Chen, Ellis & Suresh, 2016). Recent research has leveraged expectancy theory to investigate employee motivation in diverse settings, including the banking sector in Cameroon (Edjimibi Nga, 2019) and construction project financing in Nigeria (Adamu & Idris, 2024). This study builds upon this theoretical foundation to examine the moderating effect of financial availability awareness on the relationship between construction project financing requirements and project delivery delay.

Specifically, it explores how financial availability awareness, encompassing knowledge of construction project financing options, mechanisms, and the impact of past experiences on financing awareness, influences the relationship between project financing requirements (cost of borrowing and collateral requirements) and project delivery delay.

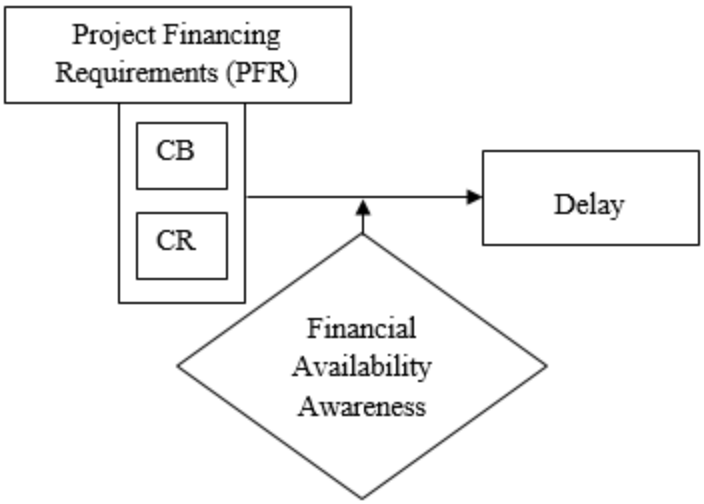

Figure 1: Theoretical Framework
Project Financing Requirements: Cost of borrowing (CB), Collateral requirements (CR)

Conceptual Framework

Project delivery delays

Construction project delivery delay refers to the phenomenon where a construction project's actual completion time exceeds its planned or scheduled completion time, resulting in a discrepancy between the anticipated and actual project duration (Ahmed, Aibinu & Oke, 2022). In other words, construction project delivery delay occurs when a project takes longer to complete than initially planned, which could lead to potential time and cost overruns, quality issues, reputational damage and decreased client satisfaction. Construction project delays are a pervasive issue, resulting in significant economic and reputational consequences (Ahmed, Aibinu & Oke, 2022). Wang, Li & Zhang (2022) opined that construction project delivery delays can undermine the success of construction projects, leading to cost overruns, schedule extensions, quality problems while the authors reported effective project management strategies including regular monitoring and control as essential instruments to mitigate these risks and ensure timely project delivery and project success.

Project financing

A comprehensive approach to construction project financing is crucial, involving accurate forecasting, budgeting, and procurement of funds, as well as effective management of these resources to ensure timely and cost-efficient project delivery (Adamu & Idris, 2024). Inadequate funding is a significant obstacle in Nigeria's construction industry, often resulting in delayed or abandoned projects and compromised quality (Makun & Ganiyu, 2019). To address the infrastructure financing gap, innovative strategies such as public-private partnerships, infrastructure concessions, green bonds, and crowdfunding are gaining traction (GIH, 2020). Financial institutions, including commercial banks, development banks, and institutional investors, play a pivotal role in providing project financing solutions, encompassing debt, equity, and hybrid instruments (Shuliak & Horyn, 2022). The collaborative efforts of financial institutions, governments, and construction stakeholders are vital in achieving successful project financing outcomes (Aghimien *et al.*, 2022).

Project financing requirements and project delivery delay

In medium to long-term construction project financing, commercial banks, institutional investors, and multilateral corporations adopt a comprehensive approach to debt and equity financing. This involves assessing project feasibility and viability, followed by evaluating collateral requirements and interest rates as critical prerequisites (Abuye, 2020; Ofori *et al.*, 2017). Lenders typically require collateral as a risk mitigation strategy, rather than intending to seize specific assets in the event of project failure (Gatti, 2015; Abuye, 2020). Instead, they aim to establish a robust security package that grants control over the Special Purpose Vehicle (SPV) if project performance raises concerns about debt servicing (Klein & So, 2015; Gatti, 2015). This security package typically includes a mortgage on fixed assets, a pledge on the project company's shares and bank accounts, and covenants imposing additional obligations on the borrower (Shuliuk & Horyn, 2022). Recent research highlights the inherent risk of interest rate fluctuations in project finance deals, primarily due to their long-term nature, which can expose projects to potential interest rate risks (Bhattacharya, Chakraborty & Gupta, 2020). This complexity is further compounded by the intricate structures of project finance, often involving multiple lenders and equity investors (Klein & So, 2015). Globally, multilateral project financing is widespread, with regional concentrations in Western Europe, North America, Africa, the Middle East, and South Asia (Marques, Ferreira, & Vieira, 2020).

Yasrizal *et al.* (2023) investigated the complexities of financing Micro and Medium Scale Enterprises (MSMEs) in West Aceh, Indonesia, with a focus on the interactions between MSMEs and financial institutions. Using a mixed-methods approach, the researchers gathered data from 100 MSMEs and applied binary logistic and probability models to analyze the data. The study's findings highlighted that MSMEs' access to financing from financial institutions is significantly impeded by several factors, including rigid collateral requirements, difficulties in loan repayment, high interest rates, and insufficient own capital.

Fachrurazi *et al*. (2023) conducted a study to identify the key factors influencing access to finance for industrial entrepreneurs in West Java, Indonesia. The researchers gathered data through a structured questionnaire survey of 200 entrepreneurs and employed structural equation modeling using Smart PLS to analyze the data. The results revealed that collateral requirements had a significant and positive impact on government policy and financial inclusion, suggesting that entrepreneurs who meet collateral requirements have an easier time accessing finance.

Abuye (2020) explored the factors influencing project finance accessibility for Small and Medium-sized Enterprises (SMEs) in Addis Ababa, Ethiopia. The study gathered primary data from 174 respondents through a structured questionnaire and employed descriptive statistics and regression analysis to analyze the data. The findings identified two crucial determinants of project finance: the cost of borrowing and collateral requirements. Notably, the study revealed a polarized impact of borrowing costs on project financing, with half of the respondents indicating a significant impact and the other half reporting no significant effect. Similarly, collateral requirements had a neutral influence on project financing, with respondents evenly split between those who reported an impact and those who did not.

Nepal *et al.* (2023) explored the role of domestic banking and financial institutions in financing hydropower projects in Nepal. Using a cross-sectional survey design, the researchers collected data from independent power producers and banking and financial institutions through questionnaires. Regression analysis was employed to test the research hypotheses. The study's findings indicated that several factors, including economic environment, default rates, central bank guidelines, availability of bankable projects, and investible fund constraints, significantly influenced project finance. Interestingly, the research revealed that banking and financial institutions consider project sponsors' credibility and potential fund misuse when providing financing, leading to the imposition of guarantee conditions to mitigate default risks and ensure successful project execution and loan repayment.

Ndala (2019) investigated the determinants of access to finance for Small and Medium Scale Enterprises (SMEs) in Blantyre, Malawi. A survey of 100 SMEs, conducted through questionnaires, found that financial institutions are inclined to provide financing to SMEs that fulfill certain collateral and interest rate conditions. Nonetheless, these stringent requirements often hinder many SMEs from securing the necessary financing, thereby limiting their growth prospects.

Osuizugbo (2020) conducted a qualitative investigation to determine the financing instruments used in construction project financing in Nigeria. The study aimed to address key challenges in the industry, including insolvency, reduced profitability, and delayed project delivery. In-depth interviews were held with stakeholders from commercial banks involved in project financing, and the data was analyzed using content analysis. The findings indicated that a diverse range of financial instruments are employed in construction project financing in Nigeria, including performance bonds, advance payment guarantees, bid bonds, retention bonds, bank guarantees, and syndicated lending arrangements.

Havolli (2023) investigated the impact of government borrowing costs on microeconomic indicators and private borrowing costs in eight European transition economies from 2003 to 2016. Utilizing panel VAR analysis, the study revealed that a 1% increase in government borrowing costs triggered a rise in borrowing costs for households and non-financial institutions, leading to decreased household consumption, sluggish investment growth, and subdued GDP growth. The findings suggest that reducing sovereign borrowing costs could have a positive multiplier effect on the economy, cascading into lower borrowing costs for households and businesses, and ultimately boosting investment, consumption, and economic growth.

A recent study by Napitupulu and Rarasati (2022) examined the financial management of the Pasir Kopo Dam construction project in Indonesia's Banten Province, which exceeded the government's sole financing capacity. The researchers investigated the relationship between financing management and completion risk, considering various risk factors, including economic, financial, supply chain, delay, environmental, and political risks. Using a mixed-methods approach, combining interviews and secondary data analysis, the study assessed the project's economic viability and identified potential risks affecting profit sharing. The findings revealed that while the project was economically viable, several factors, including raw materials reliability, construction cost escalation, high operation and maintenance costs, and construction delivery delays, could impact profit sharing.

Makun and Ganiyyu (2019) undertook an exhaustive study to investigate the causes and consequences of delays in building construction projects in Abuja, Nigeria. Utilizing a mixed-methods approach, the researchers gathered both quantitative and qualitative data, which were analyzed using simple percentages and ranking analysis. The findings revealed that time and cost overruns, primarily resulting from difficulties in securing financing, had a profound impact on construction project timelines, leading to substantial delays.

Camara and Sangiacomo (2022) examined borrowing constraints in emerging markets, using Argentina's credit registry data from 1998 to 2020 as a case study. Their analysis showed that collateralized assets played a limited role in meeting firms' debt obligations, constituting less than 15% of total debt requirements. Conversely, firms' cash flow was a dominant factor, accounting for approximately 85% of their financing needs. The study identified three key borrowing constraints: regulatory arbitrage related to central bank oversight, credit policies, and capital requirements.

Okereke, Pepple & Eze (2018) examined the impact of financing on construction project delivery in Portharcourt, Rivers State, Nigeria. The study identified bank loans and bank overdrafts as key financing sources for construction projects, among other options. A structured questionnaire was administered to 121 construction industry experts, providing valuable insights. The data was analyzed using simple percentages, Kruskal-Wallis test, and multi-linear regression analyses. The results showed that a significant majority (87.78%) of respondents recognized the substantial influence of financing on construction project delivery.

Additionally, bank loans and bank overdrafts were ranked as the second and third most popular financing options for construction projects, respectively.

In summary, this review has underscored the inconsistencies in existing research on the relationship between project financing requirements (collateral requirements and cost of borrowing) and project delivery delays. Significantly, substantial gaps were identified in terms of geographic scope, methodology, and domain, warranting further exploration. To bridge these gaps, an alternative hypothesis was formulated to investigate the relationship between project financing requirements and project delivery delays within the context of Nigeria's construction industry:

Hypothesis 1: There is a significant relationship between project financing requirements and project delivery delay in the Nigerian construction industry.

Financial availability awareness as moderator

Recent studies have highlighted the significance of financial availability awareness encompasses knowledge of construction project financing providers, information on debt or equity financing options, and the impact of past experiences on financing awareness in moderating project delivery delay (Zhang, Wang & Li, 2022). A study by Lee, Kim & Park (2022) examined the impact of financial availability awareness on project financing requirements in the South Korean construction industry. Finding of the study suggested that financial availability awareness reduced project financing requirements. Therefore, it is expected that financial availability awareness will moderate construction project financing requirements and project delivery delay in the Nigerian construction industry. The incorporation of moderators in the model design of this study, as suggested by Hair *et al.* (2020), is particularly relevant when examining complex relationships between variables.

Given the importance and effect of financial availability awareness on some of the study constructs in other geographical locations, it is essential to investigate its moderating role on project financing requirements and project delivery delay in the Nigerian construction industry. As such, the following alternative hypotheses were formulated for this study.

Hypothesis 2: There is a significant relationship between financial availability awareness and project delivery delay in the Nigerian construction industry.

Hypothesis 3: Financial availability awareness moderates the relationship between project financing requirements and project delivery delay in the Nigerian construction industry.

Methodology

Study Sample, Data Collection and Analysis

This study employed a survey research design, collecting primary data through a cross-sectional survey administered in 2024. The survey instrument, adapted from existing literature (Kirubel, 2023), assessed project financing requirements (collateral requirements and cost of borrowing), project delivery delay, and financial availability awareness as a moderating variable. The instrument's constructs were unidimensional, ensuring a focused measurement approach. The study's population consisted of construction project stakeholders in Kaduna state, encompassing clients, contractors, subcontractors, and developers. Utilizing Krejcie and Morgan's sample size determination table, an initial sample size of 384 was calculated, which was subsequently adjusted to 423 to account for potential non-responses. A total of 423 questionnaires were distributed, yielding responses from 200 contractors, 100 clients, 53 developers, and 70 subcontractors. Data analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM) with PLS 3.0 software. This approach facilitated the examination of the relationships between project financing requirements (cost of borrowing and collateral requirements), financial availability awareness (encompassing knowledge of construction project financing options, mechanisms, and the impact of past experiences on

financing awareness), and project delivery delay, aligning with the study's theoretical framework presented in Figure 1.

Results and Discussion

Assessment of SMART PLS-SEM Path Model Outcomes

The SMART PLS-SEM approach generated findings that were subjected to a rigorous two-stage evaluation, following established protocols (Henseler, Ringle & Sarstedt, 2016). A sequential examination of the measurement and structural models was conducted, drawing on existing research (Hair *et al.*, 2018). The measurement model was thoroughly assessed across several dimensions, including reliability, validity, and discriminant validity. The results of these assessments are presented in a concise manner in Tables 1-5 and Figures 2-3, offering a detailed overview of the findings.

Measurement Model Assessment

The reliability of each indicator was evaluated by examining the outer loadings of each construct's measure, in accordance with established guidelines (Hair *et al.*, 2018). Although most loadings exceeded the recommended 0.5 minimum threshold, eight items fell short of this benchmark. However, Hair *et al.* (2014) suggest that indicators with loadings between 0.4 and 0.7 can be retained if their removal does not improve the model's average variance extracted (AVE) and composite reliability (CR). Following a meticulous evaluation, 21 of the 29 items measuring the study's constructs were deemed reliable and retained, with loadings ranging from 0.539 to 0.900. The eight items with subpar loadings (PM1, PM2, PM5, PM6, PM7, PM8, PM10) were removed, consistent with Hair *et al.* (2018) recommendations. The detailed outer loadings values are presented in Figure 2 and Table 1. This rigorous evaluation process ensured that only reliable indicators were retained, thereby maintaining the integrity and validity of the study's findings.

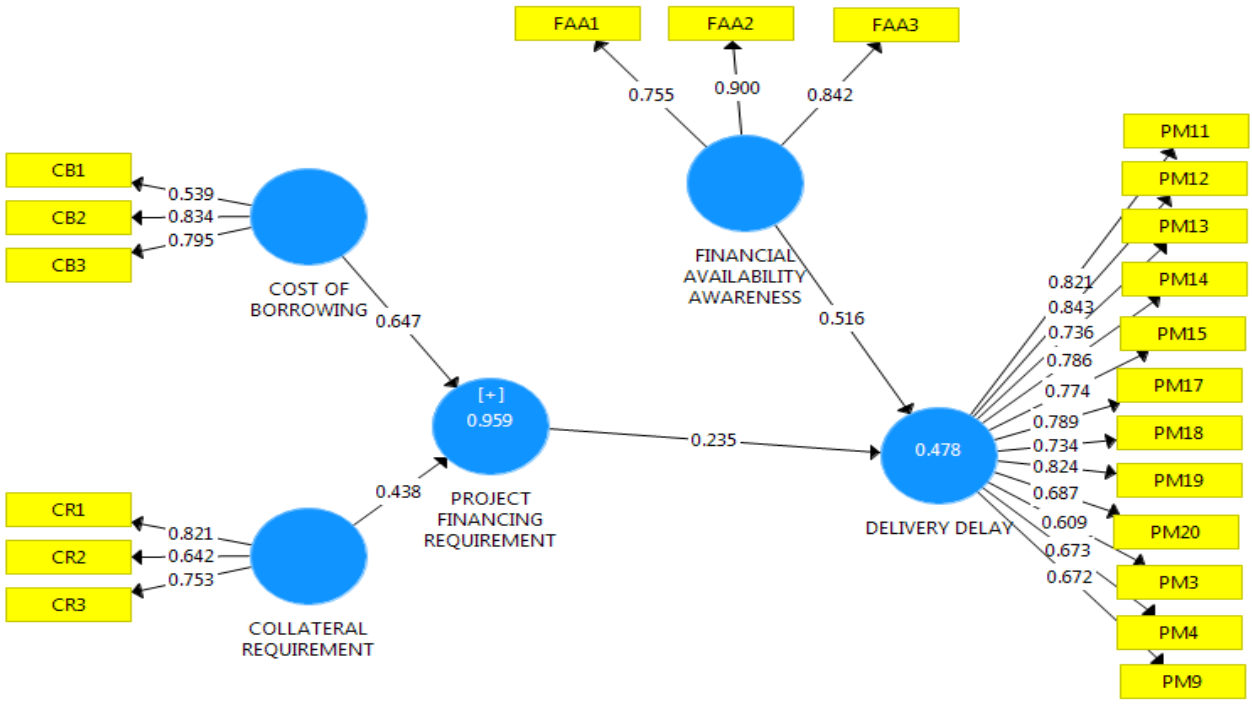

Figure 2: Measurement Model

A comprehensive evaluation of internal consistency reliability was performed using composite reliability, as advocated by Hair *et al.* (2017). This approach provides a detailed examination of indicator reliability by considering individual outer loadings. The results, summarized in Table 1, indicate that all constructs

surpassed the recommended threshold of 0.70, with the lowest composite reliability (CR) value being 0.773 for cost of borrowing under project financing requirements. This finding suggests that the constructs demonstrate satisfactory internal consistency reliability, consistent with established guidelines (Hair *et al.*, 2018). The composite reliability analysis reaffirms that the study's constructs possess adequate internal consistency reliability, thereby supporting the validity of the findings.

Convergent validity was evaluated by examining the average variance extracted (AVE) values, following the guidelines set forth by Hair *et al.* (2014). AVE values exceeding 0.50 are generally considered indicative of satisfactory convergent validity. As presented in Table 1, the AVE values for the constructs spanned from 0.540 to 0.697, thereby surpassing the recommended threshold. This finding lends credence to the notion that the constructs exhibit adequate convergent validity, suggesting that they effectively capture their respective theoretical domains. The AVE values collectively affirm that the constructs demonstrate satisfactory convergent validity.

Table 1: Measurement Model Result

Constructs	**Items**	**Loadings**	**CR**	**AVE**
Project Financing Requirements (Cost of borrowing: CB & Collateral Requirements: CR)	CB1	0.539	0.773	0.540
	CB2	0.834		
	CB3	0.795		
	CR1	0.821	0.785	0.551
	CR2	0.642		
	CR3	0.753		
Project Delivery Delay	PM3	0.609	0.938	0.561
	PM4	0.673		
	PM9	0.672		
	PM11	0.821		
	PM12	0.843		
	PM13	0.736		
	PM14	0.786		
	PM15	0.774		
	PM17	0.789		
	PM18	0.734		
	PM19	0.824		
	PM20	0.687		
Financial Availability Awareness (FAA)	FAA1	0.755	0.873	0.697
	FAA2	0.900		
	FAA3	0.842		

Source: Smart PLS extract (2025)

The distinctiveness of each construct was evaluated by assessing discriminant validity using the Heterotrait-Monotrait Ratio (HTMT) of correlation, as recommended by Henseler, Ringle & Sarstedt (2015). This approach was preferred over traditional methods, such as cross-loadings and the Fornell-Larcker criterion, due to concerns about their effectiveness in identifying discriminant validity issues (Henseler, Ringle & Sarstedt, 2015). The results, presented in Table 2, reveal that the HTMT ratio values ranged from 0.429 to 0.830, all of which fall below the recommended threshold of 0.85 (Kline, 2011). This finding indicates that

the constructs exhibit satisfactory discriminant validity, confirming that each construct is distinct and warrants retention in the model. The HTMT ratio analysis provides robust evidence of discriminant validity, supporting the notion that the study's constructs are unique, well-defined, and empirically distinct.

Table 2: Discriminant Validity using Heterotait-Monotrait Ratio (HTMT)

Constructs	CR	CB	Delay	FAA
Collateral Requirements (CR)				
Cost of Borrowing (CB)	**0.765**			
Delay	0.429	**0.737**		
Financial Availability Awareness (FAA)	0.559	0.784	**0.756**	
Financing Requirements	0.826	0.840	0.656	**0.830**

Source: Smart PLS extract (2025**)**

Structural Model Results and Discussion

The structural model, also known as the inner model, offers a visual representation of the relationships between the theoretical latent variables, providing valuable insights into the intricate relationships between these constructs (Sarstedt *et al.*, 2016). This study examined the hypothesized relationships outlined in the conceptual framework (Figure 1), with the results of these hypotheses tests presented in Figure 3 and Table 4. The findings reveal the statistically significant path coefficients and loadings, illuminating the complex interplay between the constructs and offering a deeper understanding of the underlying relationships.

Table 3: Hypothesis Test (Direct and Moderating Relationship)

Hypotheses	**Relationship**	**Beta value**	**(STDEV)**	**t-value**	**p-value**	**Findings**
H1	PFR -> DELAY	0.185	0.044	4.264	0.000	Supported
H2	FAA -> DELAY	0.50	0.052	9.626	0.000	Supported
H3	FAA*PFR -> DELAY	-0.082	0.025	3.300	0.000	Supported

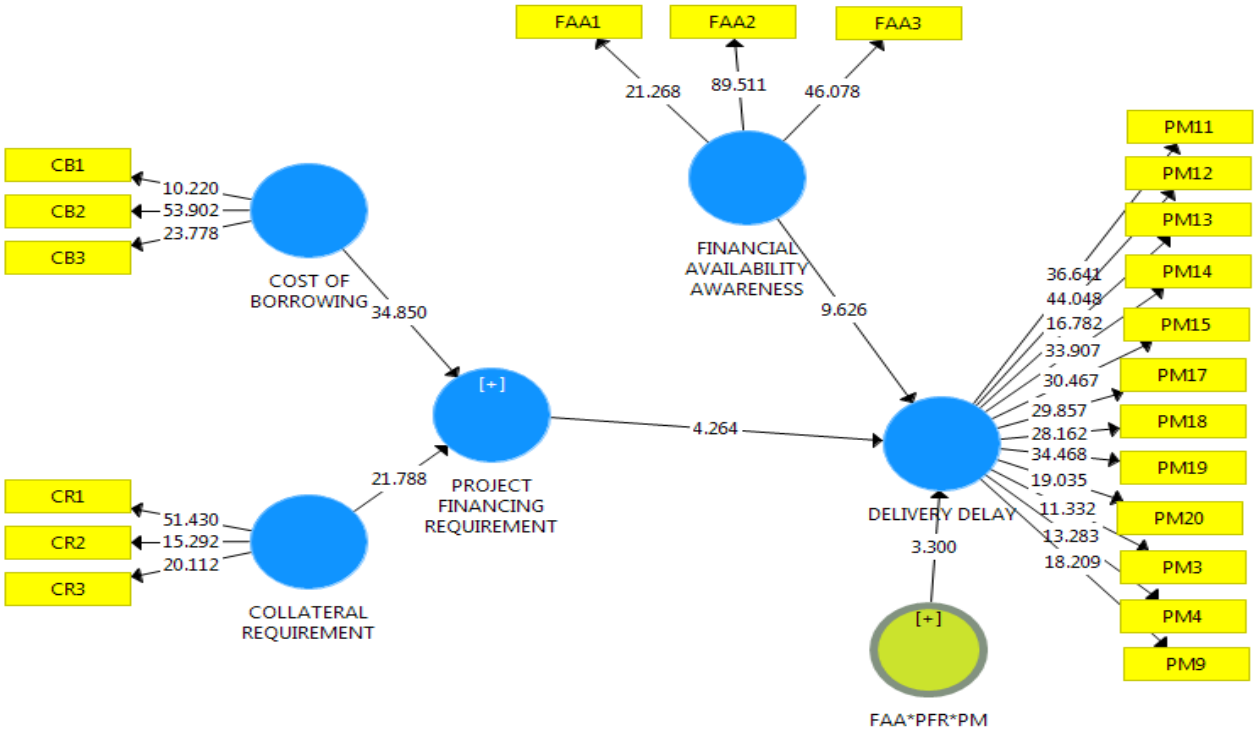

Figure 3: Structural Model

This study examined the moderating role of financial availability awareness on the relationship between project financing requirements and project delivery delay in Nigeria's construction sector. The results, as presented in Table 3, show a statistically significant positive correlation between project financing requirements (encompassing cost of borrowing and collateral requirements) and project delivery delay ($\beta = 0.185$, $t = 4.264$, $p < 0.000$). Notably, increased interest rates and stringent collateral requirements were found to deter project owners, thereby exacerbating project delivery delays. This finding supports Alternative Hypothesis 1, which posits a significant link between project financing requirements and project delivery delay. The study's findings align with previous research by Ndala (2019), Havolli (2023), and Fachrurazi *et al*. (2023), which collectively highlight the strong correlation between project financing requirements and project delivery delay. Furthermore, the results indicate that project financing requirements account for 18.5% of the variation in project delivery delay, underscoring the significance of this relationship. Expectancy theory (Vroom, 1964) provides a theoretical framework for understanding this correlation, suggesting that stakeholders' actions are motivated by their expectations of achieving desired outcomes and the perceived value of those outcomes. In the context of project financing, stakeholders seek financing options that balance affordability with minimal constraints and borrowing costs, ultimately yielding satisfactory project outcomes. The results suggest that increases in project financing requirements, particularly cost of borrowing and collateral requirements, can lead to significant increases in project delivery delay (Table 3). This implies that even marginal increases in project financing requirements can substantially prolong project timelines, emphasizing the need for judicious project financing strategies to mitigate potential delays. To minimize delays and ensure successful project outcomes, construction stakeholders must prioritize effective project financing strategies. This can be achieved by exploring alternative financing options, negotiating favourable loan terms, and developing robust financial management plans. By adopting these strategies, stakeholders can reduce the impact of project financing requirements on project delivery delay and ultimately enhance the overall efficiency of construction projects.

The results presented in Table 3 demonstrate a statistically significant positive relationship between financial availability awareness and construction project delivery delay in the Nigerian construction industry ($\beta = 0.50$,

t = 9.626, p < 0.000). This finding supports Hypothesis 2, which posits a significant link between project financial availability awareness and project delivery delay. Notably, the results indicate that a 1% reduction in the impact of lack of financial awareness corresponds to a 1% decrease in project delivery delay. Furthermore, financial availability awareness accounts for 50% of the variation in project delivery delay (Table 3), consistent with Zhang, Wang & Li (2022). This study's findings suggest that project owners lacking knowledge of project financing options, mechanisms, and past experiences with institutional investors, commercial banks, multilateral corporations, or bilateral agreements will face challenges in delivering projects using conventional methods. Insufficient financial availability awareness can lead to increased project delivery delays, particularly when anticipated savings on national earnings are slim and shareholder equity decreases due to financial constraints. Therefore, mitigating the effects of insufficient financial availability awareness is crucial to improving project outcomes and reducing project delivery delays in the Nigerian construction industry.

The results presented in Table 3 indicate that financial availability awareness plays a moderating role in the relationship between project financing requirements (cost of borrowing and collateral requirements) and project delivery delay. This finding supports Hypothesis 3, which posits that financial availability awareness moderates the relationship between project financing requirements and project delivery delay in the Nigerian construction industry (β = -0.082, t = 3.300, p < 0.001). The negative correlation coefficient (β = -0.082) implies that enhanced financial awareness provides stakeholders with diverse financing options, fosters competition among lenders, enables informed decision-making, and streamlines the application process. This, in turn, facilitates better negotiation, reduces borrowing costs and collateral requirements, and improves access to cost-effective project financing, ultimately reducing construction project delivery delays. Notably, a 1% increase in efforts to inform stakeholders about project financing options and mechanisms can lead to a corresponding 1% reduction in project financing requirements, resulting in reduced construction project delivery delays. These findings align with previous research (Zhang, Wang & Li, 2022; Lee, Kim & Park, 2022), highlighting the interconnectedness of financial availability awareness, project financing requirements, and construction project delivery delay. The study's findings emphasize the importance of effective project financing awareness in reducing project financing requirements and improving project delivery timelines. Consequently, adequate project financing availability awareness can mitigate construction project delivery delays by facilitating timely financing, improving collaboration among stakeholders, ensuring adequate funding, and promoting effective project planning and public-private partnerships.

The coefficient of determination (R-squared) provides valuable insights into the proportion of variation in the endogenous variable(s) explained by one or more predictor variables. Although acceptable R-squared thresholds vary across studies, Hair et al. (2014) recommend a minimum threshold of 0.10. The R-squared value obtained in this study is 0.478 (Table 4), indicating that the two exogenous latent variables of construction project financing requirements (cost of borrowing and collateral requirements) collectively explain 47.8% of the variance in construction project delivery delay, aligning with the research model. This value of coefficient of determination exceeds the minimum acceptable threshold, confirming that the endogenous latent variable exhibits a satisfactory level of explained variance. To evaluate the effect size of the exogenous latent variables on the endogenous variable, the F^2 value was calculated. The F^2 value represents the relative influence of a particular exogenous latent variable on the latent endogenous variable, based on changes in the R-squared value caused by the exclusion of the former (Chin, 1988; Hair *et al.*, 2014). As shown in Table 5, the F^2 values reveal that financial availability awareness has a moderate effect size on construction project delivery delay, accounting for 30.2% of the variance. In contrast, project financing requirements exhibit a relatively small effect size, accounting for 6.3% of the variance. These findings suggest that the moderator (financial availability awareness) significantly influences the relationship between the exogenous and endogenous variables, absorbing a substantial portion of the exogenous variables' influence. Consequently, this study emphasizes the importance of adequate financial availability awareness in reducing

project financing requirements, leading to cost-effective construction project financing and reduced construction project delivery delays.

Table 4: Coefficient of Determination

	R Square	Adjusted R Square
Project Delivery Delay	0.478 (47.8%)	0.475 (47.5%)

Source: Smart PLS extract (2025**)**

Table 5: Effective Size Assessment using F-Square

Construct	F-Square Delay	Effect Size
Financial Availability Awareness	0.302	Medium
Project Financing Requirements	0.063	Small

Source: Smart PLS extract 2025

Conclusion and Recommendations

This study provides a comprehensive understanding of the complex relationships between project financing requirements, financial availability awareness, and construction project delivery delay in the Nigerian construction industry. The findings highlight the significance of financial availability awareness in mitigating the impact of project financing requirements on project delivery delay. Specifically, the study reveals that financial availability awareness accounts for 50% of the variation in project delivery delay and has a moderate effect size on construction project delivery delay. Furthermore, the study finds that project financing requirements explain 18.5% of the variation in project delivery delay, emphasizing the importance of judicious project financing strategies.

Based on the findings, this study recommends that construction stakeholders prioritize financial availability awareness to reduce project financing requirements and improve project delivery timelines. Specifically, stakeholders should provide training and education programs to enhance financial awareness among project owners and stakeholders. Additionally, stakeholders should explore alternative financing options, negotiate favourable loan terms, and develop robust financial management plans. Policymakers and regulatory bodies should establish frameworks that promote financial awareness, transparency, accountability, and competitiveness in the construction financing market.

Contribution to Knowledge and Suggestions for Future Study

By emphasizing the importance of effective project financing awareness and judicious project financing strategies, this study contributes to the existing body of knowledge on construction project financing and delivery. The study's findings have significant implications for construction stakeholders, policymakers, and financing institutions, emphasizing the need for collaborative efforts to promote financial availability awareness, reduce project financing requirements, and mitigate project delivery delays. Future studies can examine the role of technology in enhancing financial availability awareness, access to project financing and improving project delivery outcomes.

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