



Mitigating Inadequate Working Capital Risks in Nigerian Construction Projects

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ABSTRACT

This study explores the factors contributing to inadequate working capital in Nigerian construction projects, identifying risk factors like delayed payments, fluctuating material costs, ineffective project management, and poor financial planning. It suggests comprehensive mitigation strategies to improve efficiency, minimize risks, and ensure sustainable growth. Proper materials management can also reduce waste generation, improve work quality, and optimize profitability for construction contractors. This study examines the impact of insufficient working capital on construction project performance, identifying strategies to mitigate adverse effects and enhance sustainability. The study uses a mixed-methods approach to examine the relationship between working capital management and construction project performance, considering ethical considerations and survey data from 670 professionals. A survey of Professional Bodies in the Built Environment in Enugu Urban, Nigeria, involved 337 copies of questionnaires of which 73% returned. Current working capital management strategies used in construction projects in Enugu Urban include aggressive (12%), moderate (17%), conservative (18%), moderate (40%), and significant (13%). A study found that 57% of respondents believe working capital management enhances a company's earnings and profitability. The null hypothesis was accepted, indicating no significant relationship between working capital management components and the time performance of construction projects in Enugu Urban. The study suggests strategies for improving cash flow management, financial planning, contractual arrangements, stakeholder collaboration, technology adoption, and policy reforms in construction companies to improve working capital management, mitigate risks, and ensure successful project delivery in Nigeria.

Keywords: Construction Projects, inadequate capital, performance, strategies, working capital

INTRODUCTION

The construction industry in Nigeria is vital for domestic capital formation and growth, accounting for 60% of national capital investment and 30% of GDP. However, it is capital-intensive, requiring effective working capital management to maintain cash flow and prevent insolvency [1]. The construction industry in Nigeria faces significant risks and uncertainties, which often require a strong understanding of project risk management [2]. Risk is a crucial aspect of any construction project, as it can cause losses, increased costs, schedule delays, and lack of quality. Project risk is an uncertain event or condition that can have both positive and negative effects on project objectives. In the construction industry, risks can be related to technical, managerial, financial, sociopolitical aspects, or natural disasters. Effective risk management techniques are essential for successful project delivery, as they help identify and manage risks in different phases of a project. Project management is one of the nine most critical parts of project commissioning, and a disconnect or negligence of this relationship can lead to project delays, abandonment, cost overrun, scope creep, and poor quality of constructed projects [3,4,5]. Insufficient working capital in Nigerian construction projects can significantly affect project performance due to high upfront costs, lengthy durations, and reliance on cash flows. The problem statement evaluates the impact of insufficient working capital on project outcomes, including financial viability, delays, cost overruns, quality of workmanship, legal implications, and market competitiveness [6, 7]. Addressing these issues can enhance efficiency, minimize risks, and ensure sustainable growth. This study evaluates the impact of inadequate working capital on construction project performance, focusing on its relationship with financial viability, sustainability, delays, cost overruns, quality of workmanship, contractual and legal implications, competitive positioning, and market reputation. It also aims to

LITERATURE

Working capital in construction industry

Working capital is a company's investment in short-term assets used to run the business daily. It can be positive or negative and is crucial for financial stability. Effective working capital management helps supply chain managers increase cash flow and profitability [8]. Contractor's use working capital to compensate for delayed certificate payments and maintain liquidity. Inadequate working capital in construction projects can lead to project delays, profitability erosion, insolvency risk, and limited investment in growth and innovation. Effective working capital management involves optimizing cash flow, managing receivables and payables, and maintaining contingency reserves. Working capital policy refers to the fundamental principles and guidelines companies follow to regulate their working capital management. It is essential for businesses to maintain efficient operations without adequate management of its working capital components [9]. Efficient working capital management involves managing unique working capital components to maintain an adequate amount of working capital for a company to function smoothly and achieve the dual objectives of profitability and liquidity. Companies should utilize accounts payable, a form of working capital financing, to the fullest extent possible. Working cash is necessary for companies to maintain daily operations and ensure they have enough cash flow to pay off short- and maturing-term obligations and impending operating costs. Proper working capital planning, coordination, and management are essential for lowering related costs and boosting revenue and profitability [11]. Ratios can be used in financial theory to manage working capital, evaluating inventories and receivables, and identifying indicators of value degradation or unjustified build-up of inventory and receivables. The importance of considering various factors when assessing working capital in construction projects, including suppliers' credit duration, labor and material expenses, raw material stocking, work-in-process or production cycle duration, completed items holding in anticipation of sales, client credit duration, and advance payment sum were emphasized by [12]. Working capital requirements for contractors are not determined by formulas, principles, or regulations but are influenced by economic recession, weather conditions, price changes and inflation, and the concept of interim payments [13]. Contractors' success is determined in large part by the timely and equitable distribution of funds, which are calculated by adding the value of materials on site, any additional amount stated under the contract, and the overall value of work completed. Factors affecting the decision about interim payments include the form of contracts, contractor cash flow, procurement method, dispute likelihood, project size, speed of completion, cost certainty, time certainty, project complexity, and flexibility for changes [14]. Delay in interim payments can lead to financial hardship, adverse knock-on effects on other individuals, cash flow issues, and delays in project completion. Contractors may lose their employees, lose their money until the dispute is settled, and the entire building process is negatively impacted. Effective and timely payment in construction projects is crucial for project success. Potential consequences of delayed payments include financial hardship, cascading implications, cash flow issues, and delays in project completion. Contractors should be aware of these potential consequences and take steps to ensure timely and equitable payment practices [15].

Impact of inadequate working capital

Inadequate working capital significantly impacts construction project delays and cost overruns. It leads to delayed procurement of materials and equipment, labor shortages, reduced productivity, increased rework and change orders, poor project management, suboptimal resource allocation, and contractual disputes. Contractors may struggle to pay wages and subcontractors, leading to demotivation and higher turnover rates [16, 17]. Cash flow constraints can also impede effective project management, causing poor decision-making and communication breakdowns. Suboptimal resource allocation and planning practices may result in project delays, quality issues, and higher costs. Contractual penalties and legal disputes can also arise from project delays, leading to legal disputes and further project complications. To address these challenges, proactive working capital management strategies, effective project planning, and close collaboration among stakeholders are essential. Inadequate working capital in construction projects can lead to negative consequences such as the substitution of lower-quality materials, skilled labor shortages, deferred maintenance and repairs, lack of quality control measures, poor workmanship, and legal and financial risks. To address these challenges, proactive working capital management, adherence to quality standards, investment in skilled labor and training, and a commitment to delivering projects that meet or exceed client expectations are essential [18]. A qualitative study investigating the impact of poor materials management on construction sites in Abuja, Nigeria, found that poor materials management significantly affects material waste generation, moderate effects on the quality of building projects, and both considerable and moderate effects on profitability [19]. Effective management of materials in construction projects can reduce waste generation, improve work quality, and offer optimal profitability for construction contractors. The Nigerian construction sector is crucial for the country's economic development, contributing half of fixed capital investment. The cost of construction

materials can be 50% to 70% of total expenditure. Construction waste is a major problem in the industry, affecting efficiency and environmental impact. Sources of waste include unused materials, incorrect materials, surplus stencils, and concrete materials. Poor materials handling, erroneous cuttings, improper equipment, poor storage facilities, poor workmanship, and inaccurate measurements contribute to waste [20]. Managing materials on construction sites is a serious issue among Nigerian subcontractors, resulting in additional costs and difficulties in storage. Manual methods for tracking materials can be problematic due to human errors. This study aims to investigate the effect of poor materials management (PMM) on site materials management and waste reduction in the Nigerian construction industry. Inadequate working capital in construction projects can lead to various challenges, including non-compliance with contractual obligations, payment delays and defaults, breach of warranties or guarantees, impact on performance bonds and insurance, contract termination and damages, and legal recourse [21]. Contractors may struggle to fulfill contractual obligations, straining relationships with clients and potentially leading to disputes, delays, and potential termination of contracts. Cash flow constraints may also result in delays or defaults in payments to subcontractors, suppliers, and other stakeholders, escalating the situation. Inadequate working capital may also hinder the contractor's ability to honor warranties or guarantees, potentially leading to legal claims for breach of warranty, damages, or rescission of the contract. Legal recourse may involve negotiation, mediation, arbitration, or litigation, emphasizing the importance of proactive risk management and dispute resolution strategies. Addressing these issues requires effective contract administration and open communication among stakeholders to ensure project success [22].

Inadequate working capital in construction firms can significantly impact their competitive positioning and reputation. It can lead to a loss of competitive bidding advantage, reduced capacity for innovation and differentiation, diminished ability to secure financing, negative impact on supplier and subcontractor relationships, reputation damage and loss of trust, and difficulty in attracting and retaining talent. Limited liquidity can prevent firms from offering competitive pricing, attractive payment terms, or value-added services compared to financially stable competitors. Inadequate working capital also limits a firm's ability to invest in innovation, technology, and differentiation strategies, resulting in a commoditized market perception [23]. Financial instability can deter lenders and investors from providing financing or capital investment, limiting a firm's ability to undertake larger projects or pursue growth opportunities. Additionally, persistent cash flow problems can damage a firm's reputation and erode trust among clients, subcontractors, suppliers, and other stakeholders. Addressing these challenges requires proactive working capital management, transparent communication, and a commitment to delivering value and reliability to clients and stakeholders.

Strategies to mitigating inadequate working capital

Inadequate working capital in construction projects can have a significant negative impact on the project's success. To mitigate this, a proactive approach is recommended, which includes optimizing cash flow management, exploring strategic financing options, strengthening contractual protections, improving project planning and budgeting, enhancing working capital efficiency, building strong relationships with stakeholders, investing in technology and automation, and continuously monitoring and adapting [24]. These strategies ensure timely inflow and outflow of funds, improve project performance, reduce administrative burdens, and foster trust and transparency. Regular monitoring and analysis of key performance indicators can help identify trends and areas for improvement, enhancing competitiveness, efficiency, and long-term sustainability in the industry. Working capital is a crucial aspect of a business's financial health and operational agility. It is calculated as the difference between a company's current assets and current liabilities. It is essential for ensuring liquidity coverage, streamlining processes, reducing unnecessary inventory, and improving receivables collection. Common factors contributing to low working capital include poor cash flow forecasting, manual operations, and inadequate systems for tracking receivables. High Radius Cash Forecasting Solution can help companies improve working capital management and achieve financial goals [25]. Key performance ratios, such as the working capital ratio, inventory turnover ratio, and collection ratio, help businesses measure liquidity and profitability. Addressing these common factors can help businesses optimize their working capital and maximize their financial potential. Strategies for boosting working capital include reducing debt, increasing cash reserves, and improving billing and collection processes. Understanding working capital is crucial for navigating economic growth. Key trends include government investment in infrastructure, the rise of digital technologies, sustainable construction practices, skilled labor challenges, and the necessity for accessible financing for SMEs. Contractors are advised to stay informed about industry developments, invest in technology, focus on skill development, explore alternative financing for working capital, adopt sustainable practices, build strong relationships, and engage in networking. Effective working capital management for contractors involves regular cash flow analysis, acceleration of receivables, optimizing credit terms, efficient inventory management, and leveraging fintech solutions. Cost control and reduction can be achieved by reviewing operational costs and outsourcing non-core activities. Long-term financial planning and forecasting can help manage working capital effectively over different project cycles [26]. Building strong relationships with clients and suppliers, effective

communication, and staying informed about government schemes and incentives can help mitigate challenges in the volatile economy.

METHODOLOGY

This study explores the relationship between working capital management and construction project performance using a mixed-methods approach. The research design involves a survey, data collection from secondary sources and primary sources like questionnaires and interviews. The sample consisted of 670 construction professionals and project managers from various professional bodies. The sample was drawn from the Enugu State Construction Transactions Registry, consisting of 337 members with extensive knowledge of working capital and its impact on construction project performance. A questionnaire was designed to collect both quantitative and qualitative data on respondents' opinions on the impact of working capital management on construction project performance. The study aims to quantify the extent of working capital inadequacy and its impact on project performance metrics, while qualitative methods, such as interviews and case studies, will provide insights into underlying causes, contextual factors, and stakeholder perspectives. Ethical considerations will be taken into account throughout the research process.

DATA ANALYSIS

Sampled questionnaire

A survey of Professional Bodies in the Built Environment in Enugu Urban, Nigeria, involved 337 questionnaires. 72% of the copies of the questionnaires distributed were returned as shown in figure 1. The majority were male (61%), indicating a larger representation of males in the construction industry. Understanding gender distribution is crucial for analyzing the impact of inadequate working capital on construction project performance, as perspectives and experiences may vary.

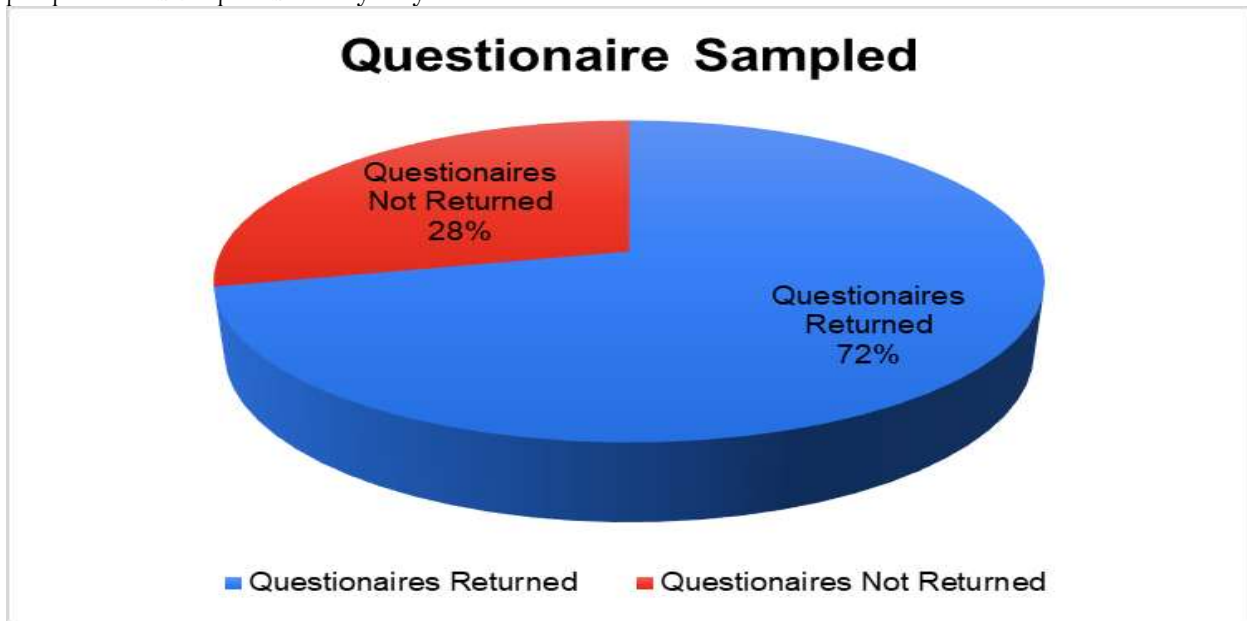


Fig. 1. Sampled questionnaire

Current working capital management strategy

The table 1 and figure 2 reveal the working capital management strategies used in construction projects in Enugu Urban. The aggressive approach (12%) is used, focusing on minimizing current assets and maximizing current liabilities. A moderate (17%) approach involves collaboration with suppliers and partners

Current working capital management strategy employed in construction project in Enugu Urban

Strategy	Frequency (F)	Percentage (%)
Aggressive Approach	30	12%
Collaborative Supply Chain Management		
Management	40	17%
Conservative Approach	44	18%
Moderate Approach	96	40%
Seasonal Variation Strategy	31	13%
Total	241	100%

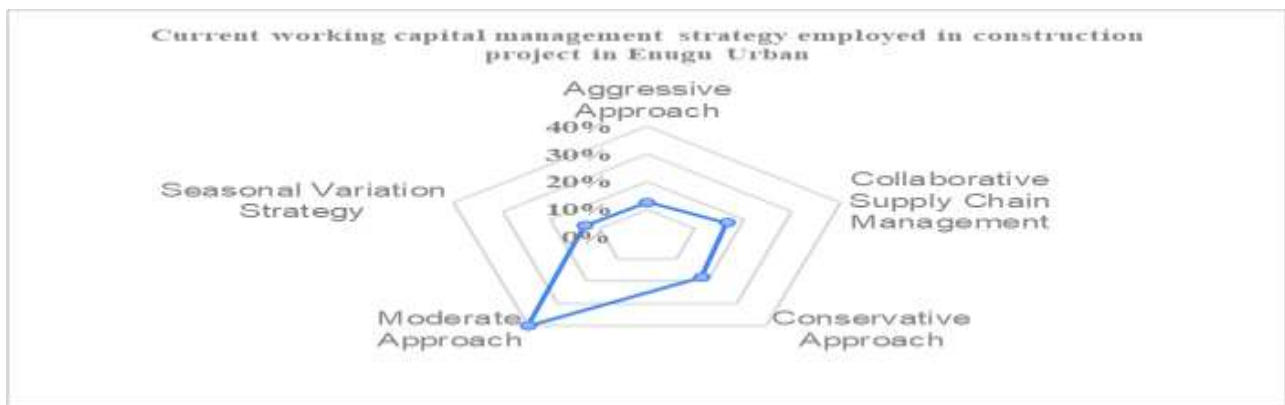


Figure 2. Current working capital management strategy employed in construction project in Enugu Urban. A conservative (18%) approach maintains higher current assets and lower liabilities. A moderate (40%) approach balances risk and return, ensuring liquidity and profitability. A significant (13%) strategy adjusts based on seasonal fluctuations in demand, revenue, or expenses.

Impact of working capital

A study in Enugu, Nigeria found that 57% of respondents believe working capital management enhances a company's earnings and profitability. However, a small percentage disagreed due to lack of understanding or specific challenges. A significant 24% strongly agreed, while none strongly disagreed, indicating a general consensus.

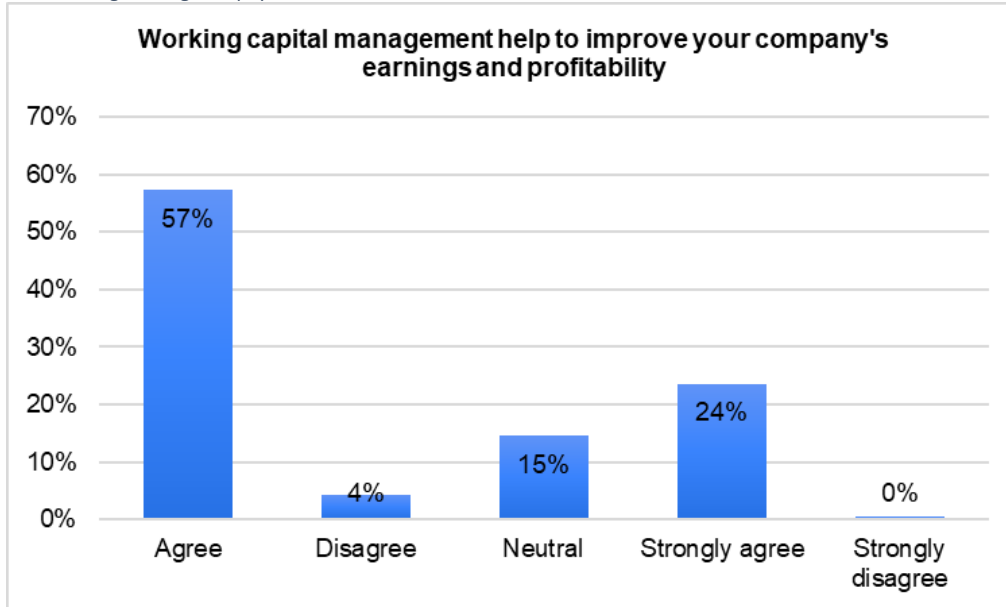


Fig 3. Impact of adequate working capital

Relationship between the component of working capital management and the time performance of construction projects in Enugu Urban.

SUMMARY OUTPUT								
<i>Regression Statistics</i>								
Multiple R	0.092009471							
R Square	0.008465743							
Adjusted R Square	-0.008339923							
Standard Error	0.656627335							
Observations	241							
<i>ANOVA</i>								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	4	0.868774892	0.217193723	0.503743383	0.733018563			
Residual	236	101.7536317	0.431159457					
Total	240	102.6224066						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	4.210079514	0.480952858	8.753621997	4.03246E-16	3.262570231	5.1575888	3.262570231	5.157588797
ICWCP	0.021593255	0.067205618	0.32130134	0.748266409	-0.110806305	0.15399282	-0.11080631	0.153992815
IPWCP	-0.058631481	0.061155757	-0.958723814	0.338679041	-0.179112412	0.06184945	-0.17911241	0.06184945
IIWCP	-0.032343458	0.066135539	-0.489048067	0.625261852	-0.162634892	0.09794798	-0.16263489	0.097947976
IRWCP	0.0545577	0.055950543	0.975105821	0.330506199	-0.05566861	0.16478401	-0.05566861	0.16478401
Sign.F = 0.7330								
Alpha = 0.05								
Decision Level = 0.7330 > 0.05								
HO: Accepted								

Source: Researchers Data Analysis Output

The significance level (F) in table 2 is 0.7330185630, which is higher than the acceptable level (0.050). Therefore, the null hypothesis is accepted, indicating no significant relationship between working capital management components and the time performance of construction projects in Enugu Urban. The alternate hypothesis, indicating a significant relationship, is rejected. The significance level was crucial in determining the outcome of this hypothesis test.

CONCLUSION

The study highlights the importance of mitigating inadequate working capital risks in Nigerian construction projects. Factors such as delayed payments, fluctuating material costs, ineffective project management, and poor financial planning contribute to these risks. To mitigate these risks, construction companies should implement strategies such as improving cash flow management, enhancing financial forecasting, and establishing robust contractual arrangements. Collaborative relationships with suppliers, subcontractors, and clients can streamline payment processes and mitigate the impact of delayed payments on working capital. Investing in technology and

advocating for policy reforms can also help. These recommendations can help construction companies in Nigeria deliver projects successfully while maintaining financial stability and competitiveness in the industry.

CONTRIBUTION TO KNOWLEDGE

The study highlights risk factors causing inadequate working capital in Nigerian construction projects, including delayed payments, fluctuating costs, and poor financial planning. It suggests mitigation strategies like cash flow management, technology adoption, and policy advocacy for improved working capital management.

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