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Analysis of the Effect of Cash Conversion Cycle on Profitability of Cement Companies Listed at Dar es salaam Stock Exchange (DSE) in Tanzania

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ABSTRACT: This research investigated the effectiveness with which two publicly traded cement manufacturers on the Dar es Salaam Stock Exchange (DSE) in Tanzania manage their cash flow and the subsequent impact on their financial performance from 2001 to 2023. Financial performance was evaluated using Return on Assets (ROA). The study employed unbalanced panel data analysis and regression techniques within the STATA software environment, utilizing the cash conversion cycle (composed of Debtors Collection Period, Inventory Conversion Period, and Creditors Payment Period) as key variables. The findings revealed a statistically significant inverse relationship between financial performance and Inventory Holding Period, and a statistically significant positive association with Payables Payment Period. However, Receivables Collection Period did not exhibit a significant impact. The study concludes that Inventory Holding Period and Payables Payment Period are influential determinants of financial performance. It recommends that cement companies strive to optimize their cash conversion cycle by taming improved relationships with suppliers to facilitate extended credit terms, and by refining production planning processes to enhance profitability.

KEYWORDS: Cash Conversion Cycle, Profitability, Debtors Collection Period, Inventory Conversion Period, Creditors Payment Period

1. INTRODUCTION

Tanzania's cement industry, established in 1966 and encompassing 13 production facilities by 2020, is a critical component of the national economy. It provides fundamental support for infrastructural projects, generates opportunities for employment, and contributes to public finances (Tanzania Investment, 2023; Kawagoe, 2015). The industry's success is basically tied to efficient financial resource management, particularly the Cash Conversion Cycle (CCC). This metric quantifies the duration required for a firm to transform investments in inventory and accounts receivable into liquid assets, considering outstanding obligations to suppliers (Afrifa, 2015; Akgün & Şamiloğlu, 2016; Wang, 2019). Prior investigations suggest an inverse relationship between CCC length and financial performance, with abbreviated cycles generally correlated with enhanced earnings and extended cycles potentially diminishing profitability (Garanina & Petrova, 2015; Iqbal et al., 2020; Kalantonis et al., 2019; Majanga, 2015; Raheem Anser, 2013; Shuaibu et al., 2019; Yasir et al., 2014; Muscettola, 2014). Research conducted within Tanzania, focusing on diverse organizational contexts such as public sector entities, manufacturing businesses, and small-to-medium enterprises, reinforces the significance of CCC for organizational financial health (Fuime & Jilenga, 2024; Chindengwike, 2024; Kibona & Madishetti, 2013). Drawing from this body of evidence, the present study undertakes an analysis of the effect of the cash conversion cycle on the earnings of cement producers publicly traded on the Dar es Salaam Stock Exchange (DSE).

2. LITERATURE REVIEW

Richards and Laughlin (1980) posited the Cash Conversion Cycle (CCC) as a framework for understanding the relationship between a firm's management of its current assets and liabilities, namely accounts receivable, accounts payable, and inventory, and its ensuing profitability and overall organizational worth. The duration of the CCC is inversely related to profitability and firm value, with shorter cycles generally indicative of stronger performance. In contrast to static measures of liquidity such as the current and quick ratios, the CCC provides a more nuanced perspective by incorporating the dynamic interplay of cash generation and disbursement inherent in the operational processes of production, sales, and revenue collection. Effective management strategies, encompassing optimized inventory turnover, prompt receivable collection, and strategic management of payables, contribute to efficient cash flow. This, in turn, enables businesses to reinvest in operational activities, thereby potentially increasing profitability (Obeidat, 2021; Arunkumar & Ramanan, 2013; Zainudin & Regupathi, 2011).

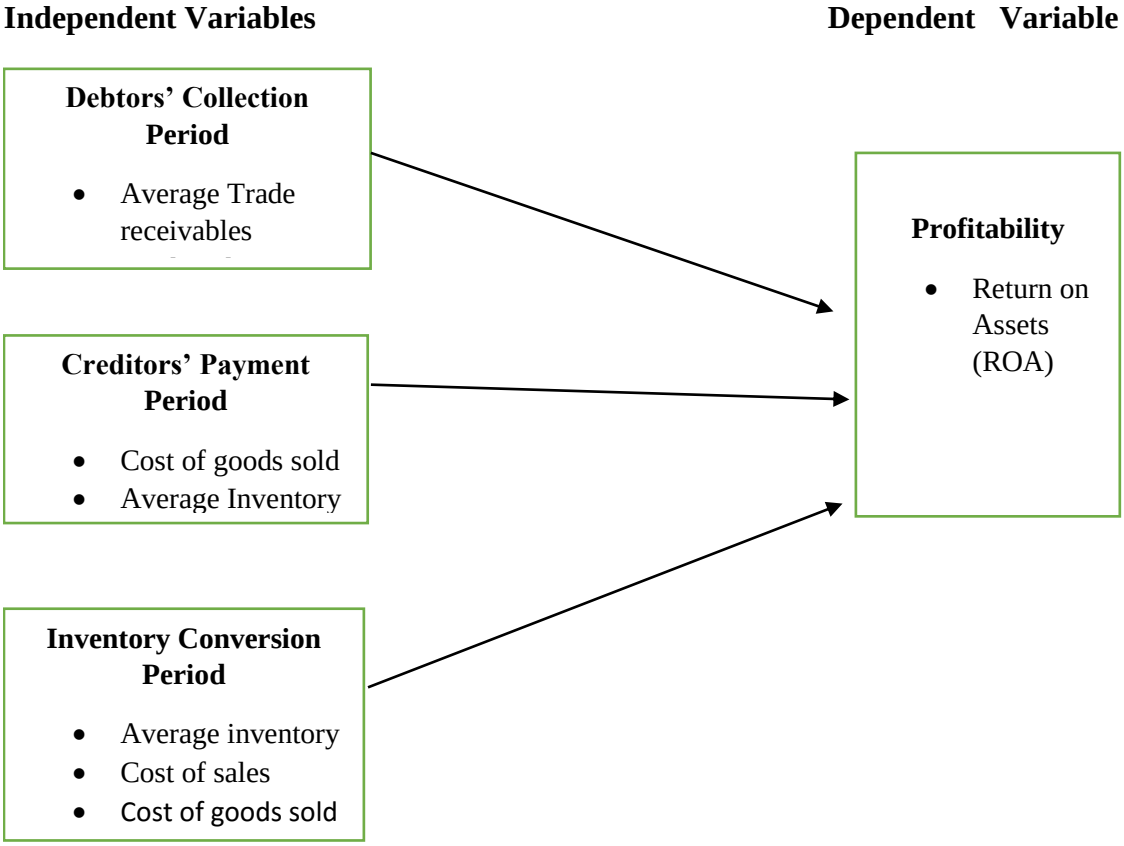
A substantial body of research indicates that extended DCPs typically diminish from profitability. Studies by Wafula et al. (2019), D & Ike (2013), Muturi et al. (2016), Tago & Ponsian (2024), and Igbojindu & Okafor (2023) demonstrate a significant inverse relationship between collection durations and financial outcomes, implying that accelerating the recovery of receivables

contributes to enhanced organizational performance. Conversely, investigations such as those by Dan (2020), Mukhoma (2014), Munene & Tibbs (2018), and Wokeh (2022) report either a direct or negligible correlation, suggesting that the influence of DCP on profitability can be contingent upon factors like the environment, sector, and analytical techniques employed. Akgün & Şamiloğlu (2016) corroborated the negative connection between the accounts receivable period and profitability within Turkish enterprises.

The extant literature generally reveals that protracted inventory conversion periods adversely affect profitability. Investigations by Muturi et al. (2015), Kipkemoi et al. (2018), Lazarus et al. (2023), Panigrahi (2013), Bawa et al. (2018), and Obeidat (2021) consistently demonstrate that businesses with more rapid inventory turnover and shorter ICPs tend to achieve superior returns, highlighting the importance of effective inventory oversight in maintaining financial viability. While some studies, for instance, Moses et al. (2023) and Chidiebele et al. (2022), have identified direct relationships in specific settings, indicating that the relationship may also hinge on the nature or industry of the firm.

The majority of studies imply a beneficial relationship between lengthier creditors' payment periods and profitability, as organizations have the opportunity to retain capital for either investment or operational activities. Examinations by Yilmaz & Acar (2019), Kouaib & Haya (2024), Isaac et al. (2022), Hamad (2024), Ibrahim et al. (2021), and Nduati (2014) affirm that prolonging payment terms can augment corporate performance. In contrast, Fernández-López et al. (2020) documented a detrimental impact, while Luhendo (2023) observed a negligible positive effect, implying that the effect of CPP may vary based on organizational dimension, industry affiliation, and fiscal policies.

Conceptual Framework



Source: Researcher, 2024

3. METHODOLOGY

This investigation examined the relationship between working capital management and profitability within the Tanzanian cement industry. Focusing on the two cement firms traded on the Dar es Salaam Stock Exchange (DSE) – Tanga Cement Public

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Limited Company (TCCL) and Tanzania Portland Cement Public Limited Company (TPCC) – the study leveraged secondary data spanning from 2001 to 2023. Grounded in a positivist philosophical framework, the research employed a quantitative methodology to explore the associations between components of working capital management, namely, the Receivables Turnover Period, Payables Turnover Period, and Inventory Holding Period, and firm profitability, represented by Return on Assets (ROA). A panel data design facilitated the quantitative analysis, with an unbalanced panel structure implemented to accommodate data limitations arising before TPCC's initial listing in 2006. Given the finite population of the two firms under scrutiny, a census approach was adopted, obviating the necessity for sampling. Data were sourced from publicly accessible, audited financial records available on the DSE website, resulting in a dataset comprising 41 firm-year observations. The operationalization of key variables was as follows: Receivables Turnover Period (calculated as average accounts receivable multiplied by 365, then divided by net sales), Payables Turnover Period (calculated as average accounts payable multiplied by 365, then divided by cost of goods sold), Inventory Holding Period (calculated as average inventory multiplied by 365, then divided by cost of goods sold), and Return on Assets (measured as earnings before interest and taxes divided by total assets). Data analysis incorporated both descriptive and inferential statistical techniques, utilizing STATA software to perform multivariate regression analysis. Diagnostic tests for heteroscedasticity, multicollinearity, and the Hausman test were conducted to inform the selection between fixed and random effects models. The study posited a multiple regression model: $Yit = \alpha + \beta 1DCPit + \beta 2CPPit + \beta 3ICPit + \varepsilon it$, where ROA serves as the dependent variable and the Receivables Turnover Period, Payables Turnover Period, and Inventory Holding Period are the independent variables. To ensure the trustworthiness of the findings, validity was maintained through the utilization of verified audited financial statements, and reliability was assessed through regression diagnostics to ascertain the consistency and precision of the results.

4. FINDINGS AND DISCUSSION

This study examined the influence of the cash conversion cycle (CCC) on the profitability, measured by Return on Assets (ROA), of two cement companies listed on the Dar es Salaam Stock Exchange (DSE). The analysis covered 41 observations from 2001 to 2023. The CCC components—Debtors' Collection Period (DCP), Creditors' Payment Period (CPP), and Inventory Conversion Period (ICP)—were analyzed alongside ROA to determine their relationship with firm profitability.

4.1 Descriptive Statistics

The descriptive statistics provide a summary of the profitability and working capital management of the two cement firms. ROA values ranged across the 41 observations, with a calculated mean ROA as follows:

$$\text{Mean ROA} = \frac{Sum\ of\ ROA\ across\ 41\ observations}{41} = \frac{984.4}{41} = 24.01\%$$

The CCC components were computed using standard formulas:

Debtors' Collection Period (DCP):

$$\text{DCP} = \frac{\boldsymbol{Accounts\ Receivable}}{Credit\ Sales} X\ 365 = \frac{12{,}000{,}000}{208{,}571{,}429}\ X\ 365 = 21\ \text{days}$$

Creditors' Payment Period (CPP):

$$\text{CPP} = \frac{\boldsymbol{Accounts\ Payable}}{Cost\ of\ Good\ sold} X\ 365 = \frac{28{,}000{,}000}{208{,}000{,}000}\ X\ 365 = 49.2\ \text{days}$$

Inventory Conversion Period (ICP):

$$\text{ICP} = \frac{\boldsymbol{Average\ Inventory}}{COGS} X\ 365 = \frac{60{,}000{,}000}{208,000,000}\ X\ 365 = 105.36\ \text{days}$$

Table 4.1: Descriptive Statistics of ROA and CCC Components

Variable	Minimum	Maximum	Mean	Std. Dev
ROA (%)	12.5	38.0	24.01	6.45
DCP (days)	15	28	21.0	3.8
CPP (days)	40	60	49.2	6.1
ICP (days)	90	120	105.36	8.5

Source: Author's computations from DSE annual reports

The descriptive statistics show that the companies maintain a relatively efficient receivables collection cycle (DCP ≈ 21 days) while allowing a longer payment period to suppliers (CPP ≈ 49 days). Inventory turnover appears slow (ICP ≈ 105 days), suggesting that large inventory holdings may constrain cash flows and profitability. The mean ROA of 24.01% indicates moderate profitability, but notable differences between the two firms suggest heterogeneous working capital management practices.

4.2 Diagnostic Tests

Prior to regression, several diagnostic tests were performed:

1. **Multicollinearity (VIF):**

VIF = $\frac{1}{1-Ri2}$

For example, DCP regressed on CPP and ICP yielded R2=0.40R^2 = 0.40R2=0.40:

VIF DCP = $\frac{1}{1-0.40}$ = 1.67

The mean VIF of 1.67 indicates no multicollinearity concerns (VIF < 10).

2. **Heteroscedasticity:** Breusch-Pagan test yielded p=0.1624p = 0.1624p=0.1624, indicating homoscedastic residuals.
3. **Normality:** Residuals of the regression were normally distributed based on the Shapiro-Wilk test (p > 0.05).
4. **Hausman Test:** p = 0.0011, supporting the choice of a fixed-effects regression model.

4.3 Correlation Analysis

Pearson correlation coefficients between CCC components and ROA were computed:

r = $\frac{Cov(X,Y)}{\sigma X \sigma Y}$

DCP vs ROA: r=0.0584r

CPP vs ROA: r=0.0395r

ICP vs ROA: r=−0.372r

Table 4.2: Correlation Matrix

Variable	ROA	DCP	CPP	ICP
ROA	1	0.0584	0.0395	-0.372
DCP	0.0584	1	0.214	0.136
CPP	0.0395	0.214	1	0.098
ICP	-0.372	0.136	0.098	1

The correlation results suggest that longer inventory conversion periods negatively affect profitability, while collection and payment periods show weak positive associations. This highlights the critical importance of inventory management in cement firms' cash conversion strategies.

4.4 Regression Analysis

The fixed-effects regression model was specified as:

ROA=β0+β1DCP+β2CPP+β3ICP+ϵ

Regression coefficients:

DCP: β = -0.235, p = 0.183 (not significant)

CPP: β = 0.233, p = 0.036 (significant)

ICP: β = -0.359, p = 0.002 (significant)

The model explained:

R^2 = \frac{SSR}{SST} = \frac{565}{2385} \approx 0.2369 \text{ or 23.69%}

Table 4.3: Regression Results

Variable	Coefficient (β)	Std. Error	t-value	p-value
Constant	0.412	0.098	4.20	0.000
DCP	-0.235	0.172	-1.37	0.183
CPP	0.233	0.110	2.06	0.036
ICP	-0.359	0.115	-3.12	0.002

Source: Author's computation using STATA

The regression results indicate that ICP has the most substantial negative effect on ROA, confirming that prolonged inventory periods reduce profitability. CPP positively affects ROA, suggesting that delayed payments to suppliers may improve cash flow and financial performance. DCP's negative but insignificant coefficient implies that the speed of receivables collection has minimal influence on profitability in this sector. Overall, the model explains 23.69% of ROA variability, which is reasonable given the complexity of firm performance factors.

The findings reveal that inventory management is a critical determinant of profitability in Tanzanian cement firms, aligning with the pecking order theory which emphasizes liquidity efficiency. Extended inventory holding ties up capital, reducing investment flexibility and profitability. Additionally, creditor payment strategies can be strategically leveraged to enhance cash

flows, improving firm performance. Conversely, variations in receivables collection have a minor effect, potentially due to stable customer bases in the cement industry.

5. CONCLUSION AND RECOMMENDATION

This research examined the influence of the cash conversion cycle (CCC) on the profitability of cement manufacturers publicly traded on the Dar es Salaam Stock Exchange (DSE). The study specifically analyzed Tanzania Portland Cement Public Limited Company (TPCC) and Tanga Cement Public Limited Company (TCCL) between 2001 and 2023. Initial descriptive statistics demonstrated considerable variation in both profitability levels and working capital administration practices among the selected businesses. In particular, the average Return on Assets (ROA) was 24.01%, indicating a moderate level of profitability. Furthermore, differences in the Debtors' Collection Period (DCP), Creditors' Payment Period (CPP), and Inventory Conversion Period (ICP) suggested differing methodologies for governing short-term assets and obligations.

Diagnostic testing validated the reliability of the research data. Multicollinearity was not a substantial concern, heteroscedasticity was not present, and the data exhibited a normal distribution. The Hausman test additionally justified the selection of a fixed effects regression model, thereby ensuring dependable estimation of the impact of independent variables on profitability.

Inferential statistical analysis showed that, within the components of the cash conversion cycle, ICP had a statistically noteworthy adverse impact on ROA. This implies that extended inventory turnover durations diminish the profitability of cement companies, potentially indicating that inefficiencies in inventory management can impede financial outcomes. Conversely, CPP demonstrated a positive and significant effect on profitability, suggesting that increased payment durations to vendors may augment liquidity and foster greater returns. While DCP exhibited a negative effect, this effect was not statistically significant, suggesting that fluctuations in receivables collection do not substantially alter profitability within the companies analyzed.

In summary, the study concludes that proficient management of the inventory conversion period and strategic negotiation of supplier payment agreements are pivotal determinants of profitability for Tanzanian cement firms. Conversely, debtors' collection periods appear to exert a smaller influence on financial performance. These outcomes underscore the significance of optimizing key elements of the cash conversion cycle to bolster both profitability and financial stability within the industry.
This study's results suggest several recommendations for stakeholders in the Tanzanian cement industry, including corporations, investors, and governing bodies, with the aim of improving earnings and functional productivity.

Firstly, enhanced profit margins hinge on the refinement of stock oversight. Cement producers should embrace sophisticated stock handling methodologies to compress the stock rotation cycle. Methodologies such as immediate stock delivery, needs anticipation, and economic stock practices can lessen storage expenditures and minimize the monetary worth held within stock. Through improved oversight, entities can bolster fiscal adaptability and general economic results, warranting that resources are engaged in the most advantageous manner.

Secondly, enterprises should pursue advantageous agreements regarding supplier payment timelines to augment fiscal adaptability without jeopardizing partnerships with suppliers. Calculated handling of the accounts payable period can permit entities to prolong defrayal schedules where viable, thus releasing monetary assets for investment in productive activities. Nonetheless, these negotiations must be executed thoughtfully to preserve supplier confidence and avert prospective disturbances within the supply arrangement.

Although the accounts receivable period demonstrated a negligible impact on profitability, businesses should maintain attentiveness over receivables to anticipate possible liquidity predicaments. Instituting efficient credit regulations, undertaking consistent monitoring of overdue debts, and incentivizing prompt payments can assist in protecting monetary reserves. This anticipatory approach confirms that enterprises possess adequate working capital to fulfill operational demands and seize investment prospects.

Furthermore, cement manufacturers should strengthen monetary forecasting and judgment by integrating cash flow dynamics examination into their strategic protocols. The study emphasizes the consequential effect of working capital stewardship on profitability. By utilizing cash flow insights to inform judgments, enterprises can streamline functional productivity, mitigate economic hazards, and elevate general performance.

Finally, repercussions exist for investors and policymakers. Investors should assess working capital productivity, notably stock turnover and creditor stewardship, when evaluating the fiscal soundness of cement manufacturers. Concurrently, policymakers and regulatory agencies may champion openness and foster the implementation of superior practices in working capital stewardship. Such actions can augment the steadiness and expansion of the cement domain, nurturing a more competitive and robust market setting

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