Original Research Article

Debt Financing Composition and Operational Efficiency of Companies listed at Nairobi Stock Exchange, Kenya.

Abstract

Background: As companies evolve, they confront a myriad of challenges, opportunities, and risks, demanding a laser focus on financial strategies. Within this landscape, the intertwined concepts of debt financing and operational efficiency emerge as critical determinants of a firm's performance and longevity. Debt financing sources presents an intricate landscape in which companies make their financial decisions. However, the existing literature often treats debt financing as a homogenous entity, lacking the granularity required to discern how the specific composition of debt, including the reliance on trade credit versus traditional short-term and long-term bank borrowings, might influence operational efficiency. Thus, this study aimed at identifying the effect of debt financing composition on operational efficiency of companies listed in NSE.

Methods: The research focused on examining the link between debt financing structures and operational efficiency in 50 firms listed on the Nairobi Securities Exchange (NSE). The study collected panel data ranging between 2015 and 2022. A positivist research philosophy was employed, utilizing quantitative analysis techniques, specifically descriptive statistical analysis and random effects regression model.

Findings: The regression results of the random effects model reveal the relationship between debt financing constructs and operational efficiency. The overall R-squared value for the model is 0.176, suggesting that around 17.6% of the variation in operational efficiency can be explained by the debt financing sub-variables. Furthermore, the model's goodness of fit is assessed through the chi-square test (χ^2 =72.61, p = 0.000), confirming its statistical significance. The coefficient for the independent variables trade credit, short-term borrowings, and long-term borrowings are (β = 0.331, p = 0.002), (β = 0.642, p = 0.001), and (β = 0.349, p = 0.001), respectively. The p-values are less than 0.05, indicating that the effects of trade credit, short-term borrowings, and long-term borrowings on the operational efficiency of firms listed at the NSE are statistically significant at the 5% level.

Conclusion and Implications: The study concludes that debt financing comprising of trade credit, short-term borrowing and long-term borrowing have beneficial effects on operational efficiency. While all three sub-variables of debt financing contribute to enhanced operational efficiency, their application in corporate financing practices varies, with long-term borrowing being a common choice for funding total assets. In light of these findings, company managers should recognize debt financing as a strategic tool for improving operational efficiency. This recognition should be accompanied by a careful and thoughtful approach to utilizing the three components of debt: trade credit, short-term borrowing, and long-term borrowing.

Keywords: *Debt Financing, Debt Financing Composition, Trade Credit, Short-term Borrowing, Long-term Borrowing and Operational Efficiency*.

1.0 INTRODUCTION

In the dynamic landscape of modern business, the effective management of financial resources is a cornerstone of success for organizations of all sizes. As companies grow and evolve, they encounter a myriad of challenges, opportunities, and risks that require meticulous attention to financial strategies. Among these strategies, debt financing and operational efficiency emerge as critical components that can significantly impact a firm's performance and sustainability (Azad *et al*.,2020). In the context of Kenyan firms listed on the Nairobi Securities Exchange (NSE), these considerations take on even greater significance.

Debt financing, the practice of borrowing funds to support operational activities and expansion, has been a topic of significant interest and debate among scholars, economists, and practitioners. (Alzoubi, 2018). It represents a crucial aspect of capital structure decisions that companies must make to strike a balance between equity and debt (Chadha & Sharma, 2015; Nwude et al., 2016). The way organizations navigate debt financing is influenced by various factors, including their size, liquidity, access to capital markets, and their broader financial objectives (Yazdanfar & Ohman, 2015).

The relationship between debt financing and operational efficiency is a complex one, characterized by various conceptual arguments and empirical observations (Agostino & Trivieri, 2019). Traditionally, the Modigliani and Miller (MM) theory of capital structure posited that a firm's value remains unaffected by its financing decisions, arguing that operations and performance are separate from financial choices Le & Phan, 2017; Abdullah & Tursoy, 2019). Empirical studies have since challenged this notion, revealing that debt indeed plays a pivotal role in shaping a company' performance, but still how it affects operational efficiency remains undetermined (Avcı, 2016; Altaf & Shah, 2020).

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Multiple theories shed light on the intricate connection between debt financing, company size, and operational efficiency. Agency theory suggests that larger firms may experience greater agency costs related to debt financing, potentially leading to inefficiencies and reduced operational effectiveness (Guo *et al*., 2020). Additionally, agency theory posits that debt introduces agency costs that can either benefit or hinder company operational efficiency Debt can motivate managers to enhance productivity to meet financial obligations, but it also carries risks such as agency costs, moral hazard problems, and a higher likelihood of default (Papadimitri *et al*., 2021). Larger organizations tend to grapple with issues of moral hazard and informational asymmetry, which can impact their ability to manage debt efficiently. Pecking order theory offers insights into how liquidity influences debt financing decisions. It posits that companies prioritize financing sources that are less risky and costly, with liquidity levels influencing these choices (Jensen & Meckling, 1976). Companies with ample liquidity may be less inclined to take on debt, while those with lower liquidity may be more predisposed to do so (Yazdanfar & Ohman, 2015).

Furthermore, it is worth highlighting that the composition of debt financing within a company's capital structure may yield distinct effects on the operational efficiency of these firms. Debt financing is not a monolithic entity; rather, it encompasses various sources and forms. Companies can access debt from diverse avenues, such as trade partners (in the form of trade credit), financial institutions (via short-term borrowings or long-term bank borrowings), or sometimes a combination of these sources. Trade credit can be defined as an

agreement to purchase goods and/or services on account without making immediate cash or cheque payments (Abuhommous, 2017). When businesses have trouble getting bank loans, they often rely more heavily on trade credit (Ogawa *et al*., 2013). Trade credit can be beneficial or detriment to a company's productivity. One-way trade credit may benefit efficiency is by easing financial pressures. When companies have limited access to bank debt, trade credit channel may be extremely important in replacing bank financing and assisting financially strapped businesses in managing their productive assets as effectively as possible (Lo Nigro *et al*., 2021). Longer period trade credit terms, however, are expensive for suppliers who are less financially stable and have a tendency to crowd out investment opportunities, leading to inefficiencies (Murfin & Njoroge, 2015).

Short-term borrowings refer to short term debt obtained from financial institutions, deferred tax liabilities and non-current liabilities used to finance firms' operations in the short run. The period of short-term borrowings may range from 3 months to 12 months (Arulraj & Annamalai, 2020). To mitigate the agency costs of managerial discretion, productive companies might use more short-maturity debt (Daskalakis *et al*., 2017). Since shorter debt maturity requires the firm to refinance frequently, it increases the firm's refinancing failure costs (Huang & Jing, 2018). Lenders do not wish to refinance the firm's short-term debt when it matures unless the prior loans are efficiently used and repaid on time. Thus, the threat of insolvency and the requirements of lenders motivate managers towards achieving high organizational productivity (Huang *et al*., 2018). Conversely, short term borrowings are associated with continually refinancing of the debt, short-term debt default risks and high debt costs, which are detriment to operational efficiency (Ang *et al*., 2019).

Long-term borrowings refer to the debt obtained from financial institutions, lease, and pension obligations to finance long-term firm operations/activities. The period of long-run borrowings may define to be from one year and above (Lotto, 2018). Moral hazard problems are likely to be amplified by longer debt maturity; hence a negative relationship between efficiency and long-term borrowings may materialize (Xu & Li, 2020). Moreover, soft-budget constraint problems may arise when banks keep financing firms even when undertaking inefficient projects to avoid their default and recuperate past loans (Yazdanfar & Ohman, 2017). However, some studies suggest that firms which management agency problems and moral hazard problems well (Pandey & Sahu, 2019) and firms where the Chief Executive Officer (CEO) holds a duality role (Chen *et al*., 2022) report good operational and productivity metrics. Long-term borrowings are also associated with high chances of bankruptcy. As the proportion of debt in the capital structure increases, the probability that the firm suffers bankruptcy becomes more. Higher default probabilities cause financial distress. To avoid financial distress managers are forced to engage in productive activities further improving operational efficiency of the firm (Ang *et al*., 2022).

This diversity in debt financing sources presents an intricate landscape in which companies make their financial decisions. However, the existing literature often treats debt financing as a homogenous entity, lacking the granularity required to discern how the specific composition of debt, including the reliance on trade credit versus traditional bank borrowings, might influence a company's operational efficiency.

Operational efficiency is a key determinant of a company's competitiveness and long-term sustainability (Azad *et al*., 2020). It encompasses how effectively a firm utilizes its resources to generate the desired output, taking into account economic conditions and scalability

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(Miencha & Selvan, 2013). Operational efficiency is not merely a metric of internal performance; it has profound implications for customer satisfaction, shareholder value, profitability, and overall financial health.

Within the context of Kenyan firms listed on the NSE, operational efficiency has emerged as a pressing concern. Despite various interventions aimed at enhancing efficiency, these organizations face operational challenges that are reflected in their financial performance and liquidity. Notably, several listed firms on the NSE have grappled with issues such as liquidity constraints, corporate governance deficiencies, and insolvency risks. Firms like Mumias Sugar Company, Kenya Power, National Bank, and TransCentury have found themselves in precarious situations, where short-term assets fall short of short-term liabilities. This predicament has not only hindered their ability to meet financial obligations but has also highlighted the broader issue of low operational efficiency. Furthermore, the delisting of companies from the NSE, including recent cases like Kenol Kobil, underscores the magnitude of challenges facing these firms. The reasons for delisting often encompass issues related to liquidity, operational efficiency, performance, and corporate governance. Such developments underscore the urgency of investigating the dynamics between debt financing and operational efficiency in the context of NSE-listed Kenyan firms.

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Against this backdrop, conducting a comprehensive study on the relationship between debt financing composition and operational efficiency among Kenyan firms listed on the NSE becomes imperative. The mixed findings and the evolving financial landscape necessitate a deeper exploration of how different debt financing constructs, including trade credit, short-term borrowing, and long-term borrowing, impact the operational efficiency of these firms. Understanding how these constructs influence operational efficiency is crucial for several reasons. First, it can offer insights into strategies that companies can employ to enhance their performance and competitiveness. Second, it can guide policymakers and regulators in formulating measures to support NSE-listed firms in navigating the complexities of debt financing. Third, the study can contribute to the existing body of knowledge on finance and operational management, enriching the understanding of the interplay between financial decisions and operational outcomes. In this endeavour, the study considered the unique characteristics of Kenyan firms, the prevailing economic conditions, and the specific challenges they face in terms of debt financing and operational efficiency. By shedding light on these critical aspects, this research aimed to provide actionable insights that can empower Kenyan firms to thrive in an increasingly dynamic and competitive business environment.

2.1 METHODOLOGY

The research studied 50 firms listed at the NSE. Given that the NSE companies have in the past achieved varying operational efficiency and followed different debt financing structure presents a good setting for the study on debt financing and operational efficiency concepts. The study did not include the firms that have been delisted in the period between 2015 and 2022 because they did not have full data and their inclusion would have brought outliers which may bias the study findings. Moreover, the study took into account eight years starting from 2015 to 2022, a period in which there was interest rate capping which influenced access and cost of credit forcing some companies to sort trade credit, and short-term borrowings. The study followed positivism research philosophy and applied quantitative methods of analysis involving panel analysis regression techniques.

Trade credit was measured as ratio of account payables to total assets. The higher the ratio, the higher the percentage of trade credit used to finance total assets and consequently higher proportion of trade credit in composition of debt structure.

$$TC = \frac{Account\ Payables}{Total\ Assets}$$

Short-term borrowing refers to financial obligations that are due to be paid back within one year. These types of borrowings are often used by companies to finance current operations and to manage cash flow. It is a ratio of short-run debt obtained by firms to total assets of the firm. The higher the ratio, the more the firm depends on short-term debt financing. higher the ratio, the more the firm depends on short-term debt financing.

$$SB = \frac{\sum_{x \in s} f(x)}{Total\ Assets}$$

Where; x is the elements in set (S), S represent the debts that fall under short-term category.

Long-term borrowing refers to financial obligations that are due to be paid back over a period of more than one year, usually several years. It is a ratio of long-run borrowings obtained by firms to total assets of the firm. The higher the ratio, the more the firm depends on long-term debt financing.

$$LB = \frac{\sum_{x \in s} f(x)}{Total\ Assets}$$

Where; x is the elements in set (S), S represent the debts that fall under long-term category.

Operational efficiency was measured using operating ratio shows the efficiency of the company by comparing the total operating expense of a company to net sales. The smaller the ratio, the more efficient the company is at generating revenue vs. total expenses. The study conducted descriptive statistical analysis. In addition, following the Hausman tests results, the study employed random effects model. The study also tested for stationarity, normality, linearity, heteroskedasticity, multicollinearity, and autocorrelation of the variables prior to conducting random effects model presented in equation below.

$$OE_{it} = \alpha + \beta_1 TC_{it} + \beta_2 SB_{it} + \beta_3 LB_{it} + \varepsilon_{it}$$

Where, OE is operational efficiency, TC is trade credit, SB is short-term borrowing, LB is long-term borrowing and ε is the error term.

RESULTS

Descriptive Statistical Analysis

Table 1 Descriptive Summary Statistics

Variable	N	mean	Std	min	max	skewness	kurtosis
Trade credit	400	0.164	0.148	0.0005	0.9433	1.546	7.118
Short-term borrowing	400	0.128	0.12	0.001	0.643	1.298	4.315
Long-term borrowing	400	0.234	0.249	0.001	0.958	1.32	3.619

As shown in Table 1, on average, trade credit accounts for approximately 16.4% of the total assets of the companies in the sample. This suggests that a substantial portion of these companies' assets is financed through trade credit. The positive skewness of trade credit values indicates that there are a smaller number of companies with very high trade credit ratios compared to the rest of the distribution. In other words, a few companies rely significantly more on trade credit compared to the majority. Regarding short-term borrowings, the ratio of 0.128 implies that, on average, approximately 12.8% of the companies' total assets are financed through short-term borrowings. The positive skewness value of 1.298 suggests that there are a few companies with relatively higher values of short-term borrowing, indicating some variation in their reliance on short-term debt. Similarly, the mean long-term borrowing ratio of 0.234 implies that, on average, 23.4% of the companies' total assets are used to finance their operations and investments through long-term borrowings. The positive skewness value of 1.32 indicates that very few companies have a high long-term borrowing to total assets ratio, suggesting that the majority of companies have lower levels of long-term borrowing in comparison.

Preliminary and Post Estimation Tests Results

Table 2 Preliminary and Post-Estimation Tests Results

Test	**Results (P.values in parentheses)**	**Decision**
Linearity: **Correlation**	Trade credit = 0.240*** (0.000) Short-term borrowing = 0.317*** (0.001) Long-term borrowing = 0.330*** (0.001)	Positive linear relationship between debt financing constructs and operation efficiency.
Hausman test of specification	Coef = 1.882 (0.597)	
Normality: **Jarque-Bera test**	Chi(2) (0.4656), P-value = 0.7923	Residuals do not deviate from normality.
Stationarity **Levin Li Chu**	Trade credit = -15.0519 (**0.000)** Short-term borrowing = -13.523 (0.000) Long-term borrowing = -12.262 (0.000) Operational efficiency = -5.5756 (0.000)	Variables were stationary
Heteroskedasticity **Breusch-Pagan / Cook-Weisberg test**	Chi2 (1) = 0.94 (0.0148)	Model was heteroskedastic, hence robust standard errors were employed.
Autocorrelation **Wooldridge test for autocorrelation in panel data**	F(1, 49) = 0.022 (0.8874)	No first order autocorrelation.

As shown in Table 2, the tests confirm a positive linear relationship between debt financing constructs and operational efficiency. The model specification is deemed appropriate, and the residuals do not deviate significantly from normality. However, the presence of heteroskedasticity required the use of robust standard errors, and there is no first-order autocorrelation in the data.

Random Effects Regression Results

Table 3 Random Effects Model Regression Results

Random-effects GLS regression		Number of obs	= 400
Group variable	ID	Number of groups	= 50
R-sq:	Within = 0.180	Obs per group:	min= 8
	Between = 0.178		avg =8.0
	Overall = 0.176		max =8
corr(u_i, X)	0 (assumed)	Wald chi2(3)	= 72.61
		Prob > chi2	= 0.0000

(Std. Err. adjusted for 50 clusters in ID)

OE	Coef.	Robust St. Err.	t-value	p-value	[95% Conf	Interval]
Trade credit	0.331	0.107	3.08	0.002	0.12	0.541
Short-term borrowing	0.642	0.124	5.18	0.001	0.399	0.885
Long-term borrowing	0.349	0.052	6.66	0.001	0.246	0.452
Constant	0.179	0.024	7.49	0.010	0.132	0.225

**** p<.01, ** p<.05, * p<.1*

As shown in Table 3, the regression results of the random effects model reveal the relationship between debt financing constructs and operational efficiency. The overall R-squared value for the model is 0.176, suggesting that around 17.6% of the variation in operational efficiency can be explained by the debt financing sub-variables. Furthermore, the model's goodness of fit is assessed through the chi-square test (χ^2 =72.61, p = 0.000), confirming its statistical significance. The coefficient for the independent variables trade credit, short-term borrowings, and long-term borrowings are (β = 0.331, p = 0.002), (β = 0.642, p = 0.001), and (β = 0.349, p = 0.001), respectively. The p-values are less than 0.05, indicating that the effects of trade credit, short-term borrowings, and long-term borrowings on the operational efficiency of firms listed at the NSE are statistically significant at the 5% level.

The coefficient for trade credit in is 0.331, with a p-value of less than 0.01, indicating that trade credit significantly affects operational efficiency of companies listed at the NSE in Kenya. Similarly, the coefficient for short-term borrowing is 0.642, with a p-value of less than 0.01, suggesting that short-term borrowing significantly affects operational efficiency of companies listed at the NSE in Kenya. The coefficient for long-term borrowing is 0.349, with a p-value of less than 0.01, indicating that there long-term borrowing significantly affects operational efficiency of companies listed at the NSE in Kenya. The optimal regression models for the effect of debt financing sub-variables on operational efficiency of companies listed at the NSE in Kenya can be stated as follows:

$$OE_{it} = \alpha + 0.331\text{TC} + 0.642\text{SB} + 0.349\text{LB}$$

DISCUSSION, CONCLUSION AND IMPLICATIONS

Discussion

The study found that trade credit is beneficial to operational efficiency. This could be attributed to benefitted efficiency as a result of easing financial pressures. In addition, when companies have limited access to bank debt trade credit channel may be extremely important in replacing bank financing and assisting financially strapped businesses in managing their productive assets as effectively as possible (Lo Nigro et al., 2021). Trade credit, in particular, offers an attractive option for firms, being less costly and less risky than external financing. Trade credit act as a mechanism to mitigate agency costs and improve operational performance. By providing trade credit, suppliers signal their trust in the company's ability to fulfil its obligations. This reduces information asymmetry and strengthens the relationship between the company and its suppliers, leading to smoother operations and improved efficiency. Similar studies have established the positive effects of trade credit on firm efficiency. For instance, Bastos and Pindado (2007) also established that maintaining good relationships with suppliers is essential for operational efficiency. Trade credit fosters strong supplier relationships as it demonstrates the company's reliability and commitment to fulfilling its obligations. Suppliers may offer better terms and prioritize the company's orders, leading to improved supply chain efficiency and reduced production disruptions. Consistent with the study findings, Yano and Shiraishi (2011) found that trade credit is a more effective form of financial intermediation compared to bank financing, promoting the survival and expansion of small and medium-sized businesses. Fisman (2015) demonstrated the beneficial impact of trade credit on firms' capacity utilization in developing countries, while Agostino and Trivieri (2019) highlighted its role in alleviating financial pressures for Italian manufacturing firms.

The study established that short-term borrowing has positive effect on operational efficiency of firms listed at NSE. This could be because, short-term borrowing provides immediate access to liquid funds that can be used to meet short-term operational needs. This enables companies to effectively manage their cash flow and address any temporary gaps between cash inflows and outflows. It also provides flexibility in managing working capital. Companies can use these funds to optimize their inventory levels, manage accounts receivable and payable, and address seasonal fluctuations in demand. In addition, short term debt can act as a disciplinary mechanism, motivating managers to work efficiently and prioritize profitable investments. Studies by Legesse and Guo (2020) and Wu (2019) provide empirical support for the beneficial effects of short-term financing on firm efficiency, suggesting that the choice of debt structure can have implications for operational performance. Moreover, Rai and Danilevskaia (2015) emphasize that short-term debt is essential for firms to meet immediate financing needs and maintain smooth day-to-day operations, preventing liquidity issues. This access to working capital through trade credit is crucial for operational efficiency. The finding is supported by extant empirical studies. For instance, Legesse and Guo (2020) revealed that firms with high productivity are more likely to generate substantial cash flows, which enhances their capacity for short-term financing. This positive relationship suggests that short-term borrowing contributes to improved operational efficiency. Additionally, the study suggests that efficient firms have the capability to rely on short-term and internal financing, potentially reducing the need for external long-term borrowing. While their study does not exclusively focus on short-term borrowing's

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impact on operational efficiency, their findings do align with the notion that short-term borrowing is linked to enhanced operational effectiveness.

The study also found that long-term borrowings have positive effects on operational efficiency of firms listed at NSE. This is particularly because they are able to manage the agency problems and moral hazard problems caused by long-term borrowing. In addition, long-term borrowing typically offers more stable and predictable financing compared to short-term borrowing and trade credit. It provides companies with the confidence and certainty of long-term capital availability, which facilitates effective financial planning and allows for better resource allocation. This stability can contribute to smoother operations and reduce the risks associated with short-term funding gaps. Even though long-term borrowings offer more confidence and certainty as it facilitates effective planning, leading to operation efficiency, its long maturity period is limited by informational asymmetries, high debt costs and other economic uncertainties, which may limit it's immediate impact on operational efficiency, compared to short-term borrowing. Additionally, the certainty of long-term capital availability facilitated by such borrowing allows for improved financial planning and more efficient resource allocation. This alignment of interests and effective financial planning can lead to smoother operations and enhanced operational efficiency. Legesse and Guo (2020) supports the finding that long-term borrowing positively affects operational efficiency. In their empirical investigation of manufacturing firms in Italy, they established a positive relationship between long-term and short-term debt financing and firm efficiency using panel data regression techniques.

Conclusion

The study concludes that debt financing has a beneficial impact on the operational efficiency of companies listed at the Nairobi Securities Exchange (NSE) in Kenya. Trade credit, short-term borrowing, and long-term borrowing were identified as important components of debt financing that significantly influence operational efficiency. Through debt financing, companies are able to address financial constraints and allocate resources effectively, which leads to improved operational efficiency. The study further concludes that short-term borrowing has the biggest influence on operational efficiency compared to trade credit and long-term borrowings. Consequently, it can be deduced that capital structure theories are not exclusive but rather complimentary. The study provides empirical evidence that supports two theories of capital structure namely pecking order theory and agency cost theory. The study strongly supports for pecking order-theory by emphasizing that short-term debt financing has a more pronounced beneficial effect on operational efficiency compared to trade credit and long-term borrowing. Furthermore, the study validates the agency theory by demonstrating that debt financing enhances operational efficiency through mechanisms such as curbing financial slack and instilling discipline among managers. This not only aligns the interests of various stakeholders but also contributes to more effective resource allocation within the company, ultimately bolstering operational efficiency.

Managerial Implications

The study concluded that debt financing comprising of trade credit, short-term borrowing and long-term borrowing have beneficial effects on operational efficiency. While all three sub-variables of debt financing contribute to enhanced operational efficiency, their application in corporate financing practices varies, with long-term borrowing being a common choice for

funding total assets. In light of these findings, company managers should recognize debt financing as a strategic tool for improving operational efficiency. This recognition should be accompanied by a careful and thoughtful approach to utilizing the three components of debt: trade credit, short-term borrowing, and long-term borrowing. Notably, the study underscores the significance of short-term borrowing, which exerts a considerable influence due to its flexibility and cost-effectiveness in optimizing operational efficiency. Consequently, it is advisable for companies to consider a reconfiguration of their debt structure, placing more emphasis on short-term borrowing and trade credit, especially given the substantial proportion of long-term borrowing in total assets. This strategic adjustment can contribute to improved operational efficiency. At a policy level, the government and industry associations should collaborate in the development and implementation of trade credit agreement laws and policies. Government bodies can enact legislation and regulations that provide a legal foundation for trade credit agreements, while industry associations can offer valuable insights and expertise to ensure that these policies align with the specific needs and dynamics of businesses within their sectors. This collaborative approach can promote fairness, transparency, and consistency in trade credit transactions, benefiting both creditors and debtors while fostering a conducive environment for economic growth and stability.

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