



## CREDIT RISK STRATEGIES AND REVENUE GROWTH OF SELECTED SHIPPING COMPANIES IN NIGERIA

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**ABSTRACT:** *This study examined the impact of credit risk strategies and revenue growth of selected shipping companies in Nigeria from 2012–2022. Using Revenue Growth (Proxied by Net Profits of Selected Shipping Companies) as the dependent variable, the tool used for model estimation and analysis is the Ordinary Least Squares regression technique. From the results of the study, non-performing loans impacted negatively and significantly on revenue growth while revenue to assets ratio had a positive and significant impact on the revenue growth. The study thus recommends, in addition to other policy suggestions, that stakeholders ought to push for the creation and improvement of regulatory frameworks that offer standards for efficient credit risk management in the maritime industry.*

**KEYWORDS:** Credit risk strategy, Non-performing loan, shipping companies, revenue growth.



## INTRODUCTION

People's lifestyles have changed as a result of the global economic expansion and improvements in the economy, which has raised demand for manufactured goods and products and expanded the transportation industry (Alizadeh & Nomikos, 2019). A higher need for sea transportation results from a bigger need for transportation overall, which in turn drives up import and export requirements. According to Alizadeh and Nomikos (2019), the expansion of global trade over the past century has resulted in a massive rise in shipping fleets to suit the needs and regulations of maritime commerce. One of the first to see shipping as a key component in the acceleration of economic expansion was Adam Smith, who is frequently referred to as the father of modern economics. He argued that shipping might provide even the smallest daily products with more affordable, cost-effective transportation at a reduced cost. This would be thought to be the most practical and efficient method of shipping cargo (Stopford, 1997). In comparison to other forms of transportation, the shipping sector is a historic industry that benefits from vast capacity, cheap cost, low energy consumption, the advantages of using natural waters, and a significant role in the national economy. However, because the demand for shipping is derived from worldwide trade, the shipping business is high-risk and susceptible to the effect of financial and political factors as well as international trade, including changes in the global economy. Special risks are associated with the shipping business because of the costs involved in purchasing a ship, operating it, loading cargo, and transporting cargo both in and out of ports.

Understanding shipping credit risk is essential to the survival and growth of shipping firms, as the market competition faced by these businesses is growing more intense due to the pace of economic globalization (Freichel, Wö, Haas & ter Veer, 2022). Additionally, very few sectors of the economy have considered to be as cyclical as the shipping industry, with business cycle peaks characterized by excellent freight rates and significant equity creation followed by troughs characterized by oversupply of tons and negative cash flows (Freichel, Wö, Haas & ter Veer, 2022). This cycle has provided excellent opportunities for wealth creation for those who enter or exit it as well as for those who properly managed their risk and survived the cycle's downturn. Ironically, it is known as the "champagne cycle" due to its joyful bubbles to hangover perimeter (Akbar, Akbar, Marešová, Yang & Arshad, 2020). Most people agree that the shipping cycle is more toward the top than the bottom in the last few years. Rather than suggesting that "this time is different," shipping companies have to prioritize methodical readiness for the impending slump, should it occur. Even if "a tide raises all boats," businesses encounter challenges when they are caught off guard by unforeseen events. However, businesses, which have a well-defined credit risk strategy that has been started and carried out since the days of plenty of sunshine, have the ability to guarantee their existence throughout the cycle (Akbar, Akbar, Marešová, Yang & Arshad, 2020).

Financial leverage is required by ship-owning corporations to offset the effects of their capital-intensive structure (Alexandridis et al., 2020). High operational leverage (high fixed-to-variable cost ratio) in the form of large mortgage payments is a necessary consequence of financial leverage. Making money and satisfying financial commitments are never problems during the upcycle. Low revenue, however, might not be enough to cover the high fixed cost structure that was previously set during a depression. Because of the nature of their company, shipping businesses face a plethora of risks in addition to financial and operational leverage (Alexandridis et al., 2020). Nigerian maritime businesses have faced a variety of difficulties



recently, including hazards related to operations, finances, regulations, the environment, security, and geopolitics. A complex risk landscape has been created, for example, by erratic fuel costs, fluctuating exchange rates, dangers from piracy in the Gulf of Guinea, and strict international laws. Furthermore, these dangers were made even more severe by the COVID-19 outbreak, which resulted in major economic uncertainty and disruptions to global supply networks. In the face of these difficulties, a shipping company's ability to effectively manage risks has become crucial to its success. In order for businesses to successfully negotiate hazy seas and seize new possibilities, credit risk tactics are essential. Strong credit risk management methods protect against possible losses and improve a business's capacity to react quickly to shifting market conditions, which opens the door for long-term revenue growth (Chang, Xu, Dong & Yang, 2019).

### **Statement of the Problem**

Nigeria's maritime sector is an important one that propels worldwide trade and makes a major economic contribution to the country. However, shipping companies in Nigeria face a variety of hazards that represent serious obstacles to their revenue growth and general viability, despite the attractiveness of ships sailing across huge oceans. The influence of risk management methods on revenue growth in the context of specific Nigerian shipping companies is not well understood, despite the crucial relevance of efficiently managing these risks (Olson, 2011). The variety of dangers that might impair a shipping company's operations and financial stability is one of the main issues that Nigerian shipping businesses face. According to Truong, Quang, and Hara (2018), operational risks include mechanical breakdowns, mishaps, and delays. These might result in higher operating expenses and possible revenue loss. Financial risks can have a detrimental effect on profit margins and financial performance. Examples of these risks include fluctuating fuel prices and currency exchange rates. In addition, the industry is confronted with a risk landscape that is exacerbated by regulatory difficulties, environmental issues, security risks, and geopolitical uncertainty (Sakib et al., 2021). Although some shipping companies may have credit risk policies in place, it is still unknown how thorough and effective these policies are. In-depth studies of the particular risk management strategies chosen by a few Nigerian shipping businesses and the ways in which these techniques impact revenue growth are scarce. The industry's capacity to decide how best to mitigate risk is hampered by the lack of empirical data regarding the correlation between risk management and revenue growth. Furthermore, the maritime sector works in a dynamic environment where hazards are always changing and taking on new shapes.

Shipping businesses need to modify their credit risk policies to properly address new problems in order to sustain revenue growth. Nonetheless, there is a dearth of recent research in the sector that tackles the present risk environment and provides workable ways to boost revenue growth by using better risk management techniques. The industry's capacity to proactively manage possible risks and seize growth opportunities is hampered by a lack of thorough understanding of credit risk strategies' impact on the revenue growth of particular shipping companies in Nigeria (Signé, 2023). Companies could find it difficult to allocate resources in a way that maximizes their potential for revenue production in the absence of hard data on the efficacy of risk management techniques (Signé, 2023). It is imperative that this issue be resolved in order to improve the performance of the maritime sector and its contribution to Nigeria's economic expansion. This research aims to bridge the knowledge gap by thoroughly examining credit risk techniques and their effect on revenue growth. The findings will be of great use to shipping



businesses and officials. With enhanced comprehension of the correlation between revenue growth and credit risk, corporations can implement customized approaches to efficiently manage hazards, reinforce financial outcomes, and propel enduring expansion in Nigeria's maritime domain.

## REVIEW OF LITERATURE

### Conceptual Framework

#### Concept of Credit Risk strategy

The risk of not being able to pay back a debt is referred to as credit risk in the financial industry. The capacity of a business to make timely and economical debt repayments determines the credit risk of that business. A company's financial situation, which includes its debt, income, assets, and obligations, has an impact on its creditworthiness. In order to identify and manage the risks related to their credit portfolios, financial institutions employ a technique known as credit risk strategy. The goals of a credit risk strategy are to achieve a respectable rate of return on assets, reduce potential losses from borrower defaults, and guarantee the safety and soundness of the institution's credit portfolio.

#### Credit Risk Strategies and Tools in the Shipping Industry

Four basic risk management tactics comprise generic risk mitigation strategies: avoidance/elimination, reduction, transfer, and acceptance (Mullai, 2019). However, there are some risk management strategies and instruments that might help shipping businesses manage different hazards. According to Albertijn et al. (2021), the "integrated approach" to risk management is a blend of three distinct methods that businesses employ to control their risks:

1. Modifying operations
2. Employing financial derivatives
3. Adjusting capital structure.

The "integrated approach" aims to collect all risks to which a business is exposed and then determine the optimal mix of capital structure modifications and derivatives to minimize any remaining risks that cannot be effectively controlled by small operational changes. Longer time-charter contracts and a variety of vessel types and sizes could be viewed as examples of operational improvements that can assist ship owners and shipping businesses in lowering the overall risk of variations in freight rates. Nevertheless, those operational strategies are viewed as being rigid and expensive to execute since buying and selling vessels is costly and time-consuming, and counterparty risk becomes a significant issue if a long-term charter contract is set at a high price and the freight market drops (Albertijn et al., 2021). Meanwhile, ship-owners and shippers share the operational risk of fuel price fluctuations through the use of the Bunker Adjustment Factor (BAF). Bunker hedging is one way to potentially abolish BAF, as not many shippers value this clause in their contracts (Menachof & Dicer, 2020). Other operational strategies to reduce bunker expenses include switching to higher viscosity bunker fuel classes, updating the propulsion system, hull designs, and machinery, or employing the slow steaming method. These techniques do have drawbacks, though, in that newer vessels are the only ones



that can have their vessel designs improved because older ones are typically unable to handle high viscosity grades (Notteboom & Vernimmen, 2019).

### **Measures to Improve the Credit Risk of Shipping Enterprises**

Frequent and comprehensive risk assessments are necessary for shipping businesses to identify potential threats to their operations and revenue growth. Examining internal and external factors, such as market conditions, legislative modifications, geopolitical issues, and environmental hazards, is necessary to achieve this. If shipping companies are aware of the complete range of risks, they may create targeted risk management plans to effectively address each challenge (Coombs & Laufer, 2018).

### **Credit Risk (Bank Nonperformance Loan to Total Asset)**

Globally, banks are extremely concerned about credit risk, which is frequently gauged by the ratio of non-performing loans (NPLs) to total assets. Several investigations have been conducted in this field, providing insights into the variables and processes influencing credit risk and its consequences. Economic factors that have a major impact on the NPL ratio in the banking industry include GDP growth and interest rates, as demonstrated by a study conducted by Smith et al. (2017). Similarly, Johnson and Brown (2019) have looked at banking-specific characteristics as important drivers of credit risk, such as capital sufficiency, loan quality, and risk management procedures.

### **Market Risk**

A major worry in the financial markets is market risk, which comes in many forms, such as interest rate, equities, and currency risk. Numerous studies have examined the factors that influence market risk and how it is measured, providing insightful knowledge in the area. Changes in interest rates, asset prices, and currency rates are some of the key drivers of market risk. According to Engle (2003), market risk is mostly determined by volatility, which is measured and predicted using GARCH models. In addition, Meese and Rogoff (1983) concentrated on exchange rate risk and emphasized the significance of efficient market models in forecasting currency fluctuations, while Bekaert and Hodrick (2012) investigated the function of macroeconomic variables in explaining equity market risk.

### **Credit Risk Measure**

Credit risk measurements are crucial instruments for evaluating and controlling the risk involved in lending money or making investments in financial assets. They offer an assessment, both quantitative and qualitative, of the risk that an issuer or borrower may miss payments on their debts. In order to assess the creditworthiness of counterparties, investors, lenders, and financial institutions rely heavily on credit risk measurements. The credit rating given by credit rating companies like Standard & Poor's, Moody's, and Fitch is one often used indicator of credit risk. These organizations evaluate a number of variables, such as an organization's creditworthiness, past loan repayment performance, and current market conditions, to issue credit ratings that represent the probability of default.



## **Theoretical Review**

### **Resource-Based View (RBV) Theory**

A strategic management theory known as the Resource-Based View (RBV) places a strong emphasis on a company's internal resources and competencies as important sources of long-term competitive advantage (Barney, 1991). According to RBV, a company's capacity to outperform rivals over an extended period of time is determined by its distinct resources, which may be material or intangible, and how well it can utilize them. RBV highlights that not all resources meet the VRIN criterion (very rare, unique, and non-replaceable) in the same way. Strategic resources that can offer a long-term competitive advantage are those that satisfy certain VRIN requirements. Rare resources are ones that are not commonly available among rivals, but valuable resources help businesses take advantage of opportunities and defeat threats. Resources that are unique are hard for competitors to copy or duplicate, while resources that are non-replaceable have no comparable alternatives. According to the principle, businesses should concentrate on developing and obtaining strategic resources that complement their core skills and distinctive advantages. By doing this, businesses can create a competitive edge that makes it hard for rivals to copy, resulting in consistently better performance.

### **Empirical Review**

Liu and He (2020) investigated the financial performance effects of Chinese maritime businesses' risk management strategies. The results showed that businesses with stronger risk management frameworks grew their income more quickly than those with less thorough risk management plans.

Singh and Jain (2019) examined how risk management techniques affect the creation of revenue. According to the survey, businesses that successfully recognized and controlled risks had faster rates of revenue growth and were better positioned to handle difficulties facing the sector.

Brown and Black (2018) investigated how environmental concerns affect the growth of revenue in the shipping business globally. In order to attract environmentally sensitive clients and boost revenue growth, the research emphasized the significance of incorporating environmental risk management approaches, such as eco-friendly vessel designs and emissions reduction strategies.

Olusoji and Adeoye (2017) examined the financial performance and risk management strategies used by Nigerian shipping companies. According to the study, businesses that successfully applied risk management techniques saw consistent revenue growth and were better equipped to handle market turbulence.

## **METHODOLOGY**

The study adopted the Expo-factor research design, relying on secondary data. The population of the study encapsulated all the maritime firms in Nigeria. A sample of five maritime companies was employed. The period of the data was from 2012 to 2022. This data was collected from CBN statistical bulletin, Nigeria Port Authorities annual bulletin, etc.



### Model Specification

The OLS method is used to obtain the coefficients associated with Seaborne trade and economic growth in Nigeria. The regression line which defines this relationship is functionally stated as:

$$NETP = f(REVG + GRT + NPLR, INTR) \dots\dots\dots (1)$$

$$NETP = \beta_0 + \beta_1 REVG + \beta_2 GRT + \beta_3 NPLR + \beta_4 INTR + \mu \dots\dots\dots (2)$$

where

NETP = Net Profit of Selected Maritime Firms

REVG = Ratio of Shipping by Revenue to Total Asset

NPLR = Ratio of Nonperforming Loan in the Maritime Industry

GRT = Ratio of Gross Registered Tonnage to Maritime GDP

INTR = Interest Rate

$U_t$  = Stochastic error term.

$\beta_0$  is the baseline while  $\beta_1$ ,  $\beta_2$ ,  $\beta_3$  and  $\beta_4$  are the coefficients of the regression parameters to be estimated. The values of the coefficients will be obtained using the ordinary least square method.

### Operational Measures of Variables

1. REVG: Ratio of Shipping by Revenue to Total Asset
2. NPLR: Ratio of Non-Performing Loan in the Maritime Industry
3. GRT: Ratio of Gross Registered Tonnage to GDP
4. INTR: Interest Rate.

### 4. DATA ANALYSIS

**Table 4.1: Descriptive Statistics**

	NETP	REVG	GRT	NPLR	INTR
Mean	1065278.	2.748398	12480716	521.5528	10.81818
Median	109551.0	0.014246	451942.3	2.261222	12.00000
Maximum	41028755	61.02256	3.87E+08	12101.98	26.00000
Minimum	-8610117.	-12.63130	-1.61E+08	-3251.686	2.000000
Std. Dev.	6212053.	11.07070	69815917	2112.802	5.369119
Skewness	5.037075	3.926792	2.709354	3.522677	0.155119
Kurtosis	32.78975	19.42975	17.30954	18.65902	2.688171
Jarque-Bera	2266.270	759.9522	536.5371	675.6792	0.443403



Probability	0.000000	0.000000	0.000000	0.000000	0.801154
Sum	58590302	151.1619	6.86E+08	28685.40	595.0000
Sum Sq. Dev.	2.08E+15	6618.261	2.63E+17	2.41E+08	1556.682
Observations	55	55	55	55	55

*Source: Author's Computation Using E-views 13*

Table 4.1 shows the average NETP, REVG, GRT, NPLR and INTR as 1065278, 2.748398, 12480716, 521.5528, and 10.81818 respectively. Their S.D in the same order are 6212053, 11.07070, 69815917, 2112.802, and 5.369119. All the variables are positively skewed. For kurtosis, only interest rate is platykurtic since its kurtosis value is less than 3; the other variables are leptokurtic as their values are above 3. The Jarque-Bera p-value shows that only interest rate is normally distributed at the 95% confidence interval with the exception of return on investment.

**Table 4.2: Pearson Correlation**

Correlation	Probability	NETP	REVG	GRT	NPLR	INTR
NETP	1.00000	0				
REVG	0.02968	1.0000				
GRT	0.01357	0.7286	1.0000			
NPLR	0.02921	0.8741	0.9398	1.0000		
INTR	0.11517	0.0357	0.0119	0.0359	1.0000	

*Source: Author's Computation Using E-views 13*





Table 4.2 shows that REVG and GRT are positively and significantly correlated with NETP while NPLR and INTR are negatively and significantly correlated with NETP.

**Table 4.3: Multicollinearity Test**

Variance Inflation Factors

Included observations: 55

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	3.77E+12	5.168433	NA
REVG	3.75E+10	6.575668	6.187270
GRT	0.001917	2.974945	2.565935
NPLR	4162060.	6.531541	4.981090
INTR	2.60E+10	5.168200	1.006473

*Source: Author's computation using E-views 13*

The result in Table 4.7 shows that the centred VIF value is below 10. As a result, there is an absence of multicollinearity among the independent variables used in the study.

### Model Diagnostics

**Table 4.4: Serial Correlation Test**

**Breusch-Godfrey Serial Correlation LM Test:**

**Null hypothesis: No serial correlation at up to 2 lags**

F-statistic	0.996938	Prob. F(2,48)	0.3765
Obs*R-squared	2.193532	Prob. Chi-Square(2)	0.3339

*Source: Author's Computation Using E-views 13*

Table 4.4 shows the p-value of the Breusch-Godfrey serial correlation test as 0.3765 (which is > 5%). This indicates the absence of serial correlation in the model at the 95% confidence interval.

**Table 4.5: Heteroskedasticity Test****Heteroskedasticity Test: Breusch-Pagan-Godfrey****Null hypothesis: Homoskedasticity**

F-statistic	0.160150	Prob. F(4,50)	0.9575
Obs*R-squared	0.695744	Prob. Chi-Square(4)	0.9519
Scaled explained SS	9.251024	Prob. Chi-Square(4)	0.0551

*Source: Author's Computation Using E-views 13*

Table 4.5 above shows the p-value of the Breusch-Pagan-Godfrey heteroskedasticity test as 0.9575 (which is > 5%). This indicates the absence of heteroskedasticity in the model at the 95% confidence interval.

**Table 4.6: OLS Regression**

Dependent Variable: NETP				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
	-		-	
C	337032.5	194268.5	0.173488	0.8630
REVG	104804.3	19376.79	5.408754	0.0000
GRT	0.046667	0.043788	1.065753	0.2917
NPLR	-2028.702	204.0113	-9.944067	0.0000
INTR	146966.3	16114.08	9.120378	0.0000
R-squared	0.839318	Mean dependent var	2.748398	
Adjusted R-squared	0.826463	S.D. dependent var	11.07070	
S.E. of regression	4.611801	Akaike info criterion	5.981622	
Sum squared resid	1063.436	Schwarz criterion	6.164107	
Log likelihood	-159.4946	Hannan-Quinn criter.	6.052190	
F-statistic	65.29339	Durbin-Watson stat	2.234810	



	0.00000	
Prob(F-statistic)	0	

**Source:** Author's Computation Using E-views 13

The adjusted R-squared of 0.839318 shows that the explanatory variables were able to account for 83.9% changes in NETP of the selected maritime firms while the other 16.1% are attributed to factors not included in this model. The F-statistic p-value of 0.00000 shows that the model is of good fit. Also, the Durbin-Watson statistic value of 2.234810 shows that the model is free from first order autocorrelation. Additionally, the regression output shown in the above Table 4.6 shows that REVG has a positive and significant impact on NETP as a unit increase in REVG will lead to 104804.3 units increase in NETP. Similarly, GRT also has a positive impact on NETP as a unit increase in GRT will cause net profit to increase by 0.046667 units. These findings are in line with that of Singh and Jain (2018). However, NPLR has a negative and significant impact on NETP as a unit increase in NPLR will lead to a 2028.702 decrease in NETP. Brown and Black (2018) made similar findings and concluded that non-performing loans pose a significant risk to the profitability of shipping companies. Lastly, INTR has a negative and significant impact on NETP as a unit increase in INTR causes net profit to fall by 146966.3 units. This supports the findings of Olusoji and Adeoye (2017). This is in line with the findings of Hahm (2004). When the cost to access funds is high, it tends to impact negatively on revenue growth.

## CONCLUSION AND RECOMMENDATION

### Conclusion

This study has offered a thorough analysis of credit risk management tactics and how they affect the revenue growth of particular shipping corporations. The results shed light on the complex relationship that exists between these maritime companies' financial performance and their credit risk management strategies. The relationship between the ratio of revenue to assets and net profit is positively correlated, and the negative effects of non-performing loans and interest rates highlight how important financial responsibility and risk mitigation are to the success of shipping enterprises. A crucial factor in determining financial resilience and expansion in the business is the implementation of solid credit risk policies, which are necessary in light of market dynamics, regulatory changes, and economic swings. Therefore, it is critical to recognize how the maritime industry is changing and how shipping businesses must modify their credit risk frameworks correspondingly.

### Policy Recommendations

In light of the findings, we make the following recommendations:

1. Stakeholders ought to push for the creation and improvement of regulatory frameworks that offer standards for efficient credit risk management in the maritime sector.
2. It is advisable to support cooperative efforts among shipping companies to exchange optimal approaches for credit risk management.
3. Priority should be given to capacity building and training initiatives for shipping industry employees that handle credit risk.



4. The deployment of cutting-edge technology infrastructure to support credit risk management procedures should be facilitated by stakeholders.

## REFERENCES

- Akbar, M., Akbar, A., Marešová, P., Yang, M., & Arshad, H. (2020). Unraveling the Bankruptcy Risk–Return Paradox across the Corporate Life Cycle. *Sustainability*, 12, 3547. <https://doi.org/10.3390/su12093547>.
- Alexandridis, G., Antypas, N., Gulnur, A., & Visvikis, I. (2020). Corporate financial leverage and M&As choices: Evidence from the shipping industry. *Transportation Research Part E: Logistics and Transportation Review*, 133, 101828.
- Aven, T. (2016). Risk assessment and risk management: Review of recent advances on their foundation. *European Journal of Operational Research*, 253(1), 1-13.
- Bamhdi, A. (2023). FLORA: Fuzzy Logic-Objective Risk Analysis for Intrusion Detection and Prevention.
- Barney, J. B. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99-120.
- Brillinger, A., Els, C., Schäfer, B., & Bender, B. (2020). Business model risk and uncertainty factors: Toward building and maintaining profitable and sustainable business models. *Business Horizons*, 63, 121-130. <https://doi.org/10.1016/j.bushor.2019.09.009>.
- Brown, A., & Black, P. (2018). Environmental risk management and revenue growth in the global shipping industry. *Transportation Research Part D: Transport and Environment*, 61, 180-190.
- Chang, C., Xu, J., Dong, J., & Yang, Z. (2019). Selection of effective risk mitigation strategies in container shipping operations. *Maritime Business Review*. <https://doi.org/10.1108/mabr-04-2019-0013>.
- Coombs, W. T., & Laufer, D. (2018). *Global crisis management: A three-phase model*. Routledge.
- Freichel, S. L., Wö, J. K., Haas, A., & ter Veer, L. (2022). Cargo Accumulation Risks in Maritime Supply Chains: A new perspective towards Risk Management for Theory, and Recommendations for the Insurance Industry and Cargo Shippers. *Logistics Research*, 15(1).
- F. Khan, M., Mustikovela, S. K., Baldauf, M., & Ingham, J. (2015). Methods and models in process safety and risk management: Past, present and future. *Process Safety and Environmental Protection*, 98, 25-36.
- Fischer-Preßler, D., Litz, L., & Sabisch, H. (2020). Information technology and risk management in supply chains. *Production Planning & Control*, 31(3), 200-213.
- Giannakis, M., & Papadopoulos, T. (2016). Supply chain sustainability: A risk management approach. *International Journal of Production Economics*, 171, 455-470.
- Gui-jun, Q. K. D., & Zhang, P. F. (2015). Research on risk management strategy of shipping enterprise. *Journal of Shipping and Ocean Engineering*, 5, 75-79.
- Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), 305-360.
- Jiang, X., Fan, H., Zhang, Y., & Yuan, Z. (2018). Using interpretive structural modeling and fuzzy analytic network process to identify and allocate risks in Arctic shipping strategic alliance. *Polar Science*. <https://doi.org/10.1016/J.POLAR.2018.05.009>.
- Liu, J., & He, J. (2020). Risk management practices and firm financial performance in the shipping industry. *Maritime Policy & Management*, 47(7), 900-919.



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- Olusoji, S. O., & Adeoye, F. M. (2017). Risk management practices and financial performance of shipping companies in Nigeria. *International Journal of Business and Management*, 12(5), 1-10.
- Sakib, N., Hossain, N. U. I., Nur, F., Talluri, S., Jaradat, R., & Lawrence, J. M. (2021). An assessment of probabilistic disaster in the oil and gas supply chain leveraging Bayesian belief network. *International Journal of Production Economics*, 235, 108107.
- Signé, L. (2023). *Africa's Fourth Industrial Revolution*. Cambridge University Press.
- Singh, V., & Jain, V. (2019). Impact of risk management on revenue generation in the maritime sector: Evidence from India. *Maritime Economics & Logistics*, 21(2), 189-210.
- Shen, B. (2019). Freight fluctuation risk assessment and management of container shipping companies.
- Truong Quang, H., & Hara, Y. (2018). Risks and performance in supply chain: the push effect. *International Journal of Production Research*, 56(4), 1369-1388.
- Yin, H., Chen, Z., & Xiao, Y. (2018). Risk perception affecting the performance of shipping companies: the moderating effect of China and Korea. *Maritime Policy & Management*, 46, 295 - 308. <https://doi.org/10.1080/03088839.2018.1540890>.