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## Factors Affecting Fleet Charter Costs: Analysis of Market Uncertainty, Shipping Rates, Financial Capability, and Cost Structure

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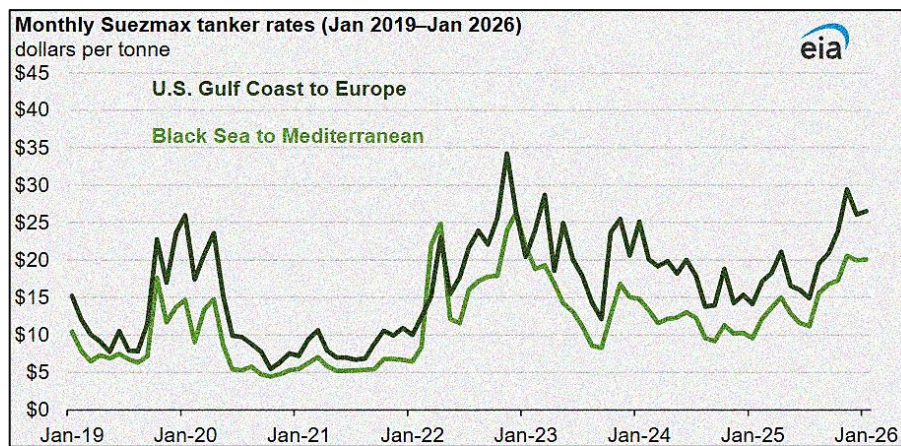
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**Abstract:** This study aims to analyze the determinants of fleet charter costs through the variables of market uncertainty, shipping rates, financial capability, and cost structure. The study uses a qualitative approach with a systematic literature review (SLR) method on 30 national and internationally reputable scientific articles. Data are analyzed through the stages of reduction, presentation, and synthesis to produce a comprehensive conceptual model. This study contributes to the development of maritime transportation management literature with an integrative approach. Further research is recommended to test this model empirically using a quantitative approach and add other variables to improve the accuracy and generalization of the findings. The results of the study indicate that: 1) Market Uncertainty affects Fleet Charter Costs; 2) Shipping Rates affect Fleet Charter Costs; 3) Financial Capability affects Fleet Charter Costs; and 4) Cost Structure affects Fleet Charter Costs.

**Keywords:** Fleet Charter Costs, Market Uncertainty, Shipping Rates, Financial Capability, Cost Structure.

### INTRODUCTION

Tensions between Israel and the United States with Iran in the first quarter of 2026 caused geopolitical conditions to heat up (Roomi, 2023). This has disrupted global trade, particularly the trade of natural resources (oil, natural gas, and their derivatives) to several export destination countries. This disruption has included the closure of the Strait of Hormuz, a trade distribution route in the Persian Gulf, and the resulting threats to ships transporting commodities and passing through the Strait. As a result of this disruption, shipping companies and ship providers face a dilemma regarding the risks and security guarantees for their fleets. As a result of this increased risk, companies and ship providers have begun to increase their charter fees (Karsh, 2023).



**Figure 1. Monthly Rates for Suezmax Tankers for the period January 2019 – January 2026**  
Source: (Eiermann, 2026)

Figure 1 shows a type of Suezmax tanker, showing that monthly charter rates for Suezmax tankers experienced a significant increase from mid-2025 to January 2026. The Suezmax rate increased due to the higher VLCC tanker rates. When VLCC rates are very high due to being tied to long-haul routes, shippers may choose Suezmax as a more economical option, thus increasing Suezmax rates as well (Eiermann, 2026).

This research provides theoretical and practical contributions to the development of maritime transportation management studies, particularly regarding the determinants of vessel charter costs. Theoretically, this research enriches the literature by integrating the variables of market uncertainty, shipping rates, financial capacity, and cost structure into a comprehensive conceptual framework. This research also expands previous perspectives, which tended to be partial, into a more holistic one through a systematic literature review approach.

Although numerous studies have been conducted on shipping operational costs, several gaps remain. First, previous research tends to analyze only one or two variables separately, thus failing to provide a comprehensive picture. Second, there are still limited studies that use a systematic literature review approach to systematically synthesize various findings. Third, there are inconsistencies in previous research results regarding the dominant factors influencing vessel charter costs. Therefore, this research aims to fill this gap through an integrative approach.

This research is crucial given the increasing dynamics of the global shipping industry, characterized by cost fluctuations, market uncertainty, and increasingly intense competition. Vessel charter costs are a key component of a shipping company's cost structure, directly impacting profitability. Without a comprehensive understanding of the factors influencing them, companies are potentially prone to operational inefficiencies. Therefore, this research is highly urgent as a basis for strategic decision-making.

Based on the problem background, theoretical contributions, research gaps, and research urgency above, the research questions are formulated as follows: 1) Does market uncertainty affect fleet charter costs?; 2) Do shipping rates affect fleet charter costs?; 3) Does financial capacity affect fleet charter costs?; and 4) Does cost structure affect fleet charter costs?.

## METHOD

This study uses a qualitative approach with the Systematic Literature Review (SLR) method, which aims to systematically and comprehensively identify, evaluate, and synthesize various previous research findings. This approach was chosen because it is able to provide a deep understanding of the phenomenon under study through the integration of various scientific perspectives. The type of data used in this study is secondary data sourced from relevant

previous scientific articles, academic books, research reports, and other scientific publications. A total of 30 scientific articles served as the primary sources of research obtained from reputable international journals such as Scopus, Web of Science (WoS), Elsevier, Sage, Emerald, as well as national journals indexed by SINTA, international journals Copernicus, and EBSCO (Susanto et al., 2024).

The data collection stage was conducted through a systematic literature search using keywords relevant to the research topic and the Publish or Perish (PoP) application to broaden and narrow search results. Inclusion criteria included topic relevance to the research variables, publication in a reputable journal, and the recency of the research within a specific timeframe. Exclusion criteria included articles lacking direct relevance, duplicate publications, and sources that were not scientifically verified. All selected articles were then classified and organized based on research themes, methods, and findings to facilitate the analysis process (Boulton, M. J., & Houghton, 2021).

Data analysis in this study was conducted through several stages: data reduction, data presentation, and conclusion drawing. In the data reduction stage, researchers filtered information relevant to the research focus and eliminated irrelevant data. The data presentation stage was carried out by compiling information in the form of descriptive narratives and synthesis matrices to identify patterns of relationships between variables. Next, the conclusion drawing stage was carried out through a process of interpretation and synthesis of findings from various literature to produce a comprehensive conceptual model (M. Dewi, 2024).

To ensure data validity, this study employed source triangulation, comparing and confirming findings from various literature sources. Furthermore, article quality was evaluated based on journal credibility, methodology, and the consistency of research findings. Thus, the research findings are expected to have a high level of reliability and validity and to make a significant scientific contribution (Azhari et al., 2023).

## **RESULTS AND DISCUSSION**

### **Results**

Based on the problem formulation above, the results obtained from this literature study are as follows:

#### ***Fleet Rental Costs***

Fleet charter fees are the expenses that must be paid by the charterer to the ship owner for the use of the vessel for a specified period in accordance with the charter party agreement. These fees can be in the form of time charters, voyage charters, or bareboat charters, each of which has a different fee structure. In practice, fleet charter fees not only reflect the cost of using the vessel but also include various components such as the vessel's condition, carrying capacity, fuel efficiency, and the operational risks inherent in the shipping route (Febriyanti & Kurnia, 2025).

Indicators or dimensions contained in the vessel charter variable include: 1) Charter Rate: The amount of vessel charter rates per day (time charter) or per voyage (voyage charter) prevailing in the market. The higher the charter rate, the greater the cost burden borne by the charterer; 2) Charter Contract Duration: The term of the vessel charter agreement, whether short-term (spot) or long-term. Duration affects cost certainty and operational flexibility; 3) Additional Operational Costs: Costs outside the charter rate that are borne by the charterer, such as fuel (bunker), port fees, and loading and unloading costs; 4) Baltic Dry Index (BDI) Fluctuation: The movement of the global market index that reflects changes in bulk carrier charter prices. The BDI is the main reference in assessing fleet charter cost trends in the international market (Mangunsong et al., 2023).

The variable of ship rental fleet is relevant to previous research conducted by: (Herawati & Nurmayanti, 2022), (Yolandita, 2024), (Itqiyah & Rachman, 2022).

### ***Market Uncertainty***

Market uncertainty refers to conditions in which industry players face difficulties in predicting changes in the market, whether in terms of demand, supply, or other external factors. Market uncertainty can stem from fluctuations in demand for shipping services, changes in global commodity prices, geopolitical conditions, and disruptions to international supply chains. This uncertainty creates risks for companies in making strategic decisions, including determining vessel charter contracts, fleet investments, and setting tariffs (Lam et al., 2021).

Indicators or dimensions contained in the market uncertainty variable include: 1) Fuel Price Volatility: Fluctuations in bunker prices (ship fuel) that cannot be predicted with certainty, thus affecting overall operational cost planning; 2) Changes in Cargo Demand: Instability in the volume of cargo available in the market due to changes in global economic conditions, seasons, or international trade policies; 3) Geopolitical Risk: The threat of uncertainty due to geopolitical conflicts, embargoes, changes in international maritime regulations (IMO), or customs policies that can disrupt trade flows; 4) Currency Exchange Rate Instability: Fluctuations in exchange rates (especially USD as the dominant currency in shipping transactions) that affect the real value of shipping costs and revenues (Melas et al., 2025).

The market uncertainty variable is relevant to previous research conducted by: (Drakos & Tsouknidis, 2024), (Jeon, 2022), (Pouliasis & Bentsos, 2024).

### ***Shipping Rates***

Shipping rates are the prices charged to service users for transporting goods or passengers by sea. These rates reflect the economic value of the service provided and are the primary source of revenue for shipping companies. Shipping rates are determined by various factors, such as distance traveled, cargo type, vessel capacity, market conditions, and the level of competition between companies. Furthermore, operational costs such as fuel, labor, and port fees are also key considerations in setting rates (Saputra & Bailey, 2022).

Indicators or dimensions contained in the shipping rate variable include: 1) Freight Rate per Cargo Unit: The rate charged to shippers per ton, per TEU, or per unit of cargo. This rate reflects the company's ability to cover operational costs and generate margins; 2) Tariff Competitiveness in the Market: Comparison of shipping rates offered by the company with competitors on the same route. Rates that are too high risk losing customers, while rates that are too low reduce profitability; 3) Surcharges and Additional Costs: Additional cost components beyond the base rate, such as fuel surcharge (BAF), terminal handling charge (THC), and war risk surcharge, which affect the total cost paid by customers; 4) Long-Term Contract Stability: The company's ability to secure long-term shipping contracts at agreed rates, thus providing revenue certainty and protection from spot market fluctuations (Prayogi et al., 2025).

The shipping rate variable is relevant to previous research conducted by: (Anggraeni et al., 2024), (Tjahjudi, 2023), (Saputra & Bailey, 2022).

### ***Financial Capability***

Financial capability is a company's capacity to manage financial resources to meet operational, investment, and financing obligations sustainably. In the shipping context, financial capability reflects the extent to which a company can cover vessel charter fees, operational costs, and cope with fluctuations in costs and revenues. Indicators of financial

capability can be seen in the company's liquidity, solvency, profitability, and cash flow (Yang & Mekrangsiman, 2023).

Indicators or dimensions contained in the financial capability variable include: 1) Company Liquidity: The company's ability to meet short-term financial obligations, including vessel rental payments, crew salaries, and daily operational costs without experiencing cash flow disruptions; 2) Debt to Equity Ratio (DER): The proportion of company financing that comes from debt compared to equity. A high DER indicates a heavy dependence on loans, which increases financial risk when costs rise; 3) Access to Financing/Credit: The company's ease in obtaining credit or capital facilities from banks and financial institutions to finance operations, fleet expansion, or cover cash flow deficits; 4) Operational Profitability (EBITDA/Profit Margin): The level of profit generated from shipping operations before deducting interest, taxes, and depreciation. This indicator reflects the financial health and operational efficiency of the company (Maraga & do Rosário, 2024).

The financial capability variable is relevant to previous research conducted by: (Lin et al., 2022), (Yang & Mekrangsiman, 2023).

**Cost Structure**

Cost structure is the overall composition of costs incurred by a company in carrying out its operational activities. In the shipping industry, the cost structure consists of fixed costs and variable costs. Fixed costs include vessel charter, crew salaries, and insurance, while variable costs include fuel, port fees, and maintenance costs, which depend on operational intensity (Xu et al., 2024).

Indicators or dimensions contained in the cost structure variable include: 1) Proportion of Fixed Costs: The portion of costs that do not change regardless of cargo volume or number of voyages, such as charter hire fees, fixed crew salaries, and insurance premiums. A high proportion increases the risk of loss when revenues decline; 2) Proportion of Variable Costs: Cost components that fluctuate according to operational activities, such as fuel costs, port fees, and loading and unloading costs. Managing variable costs is crucial in maintaining efficiency; 3) Ship Operating Expense Efficiency (OPEX): The company's ability to efficiently manage ship operating costs, including maintenance, repairs, and crew management, to reduce the cost per unit of shipping production; 4) Allocation of Overhead and Administrative Costs: The amount of indirect costs charged to shipping operations, such as office costs, management, information technology, and regulatory compliance, which affect the company's overall cost structure (Cullinane & Yang, 2022).

The cost structure variable is relevant to previous research conducted by: (Li & Zhou, 2021), (Cullinane & Yang, 2022).

**Previous Research**

Based on the above findings and previous research, the research discussion is formulated as follows:

**Table 1. Relevant Previous Research Results**

No	Author (Year)	Research result	Similarities with this study	Differences with this research	Hypothesis
1	(Pangesti et al., 2025)	Market Uncertainty and Marketing Strategy Variables Influence the Rental Cost of Anchor Handling Tuh Supply (AHTS) Vessel Fleets at Offshore Support Vessel Companies	Similarities with this research on the Independent variable Market Uncertainty and the Fleet Rental Cost variable	There are research objects carried out at Offshore Support Vessel Companies	H1

No	Author (Year)	Research result	Similarities with this study	Differences with this research	Hypothesis
2	(Tjahjuadi, 2023)	The Effect of Service Quality, Delivery Timeliness, and Shipping Rates on Fleet Rental Costs at PT. Nusatrans Anugerah Makmur	Similarities with this research on the Independent variable Shipping Rates and the Dependent variable Fleet Rental Costs	There is a research object conducted at PT. Nusatrans Anugerah Makmur	H2
3	(Saputri & Hergastyasmarwan, 2025)	Differential Cost and Financial Capability Variables Influence the Tugboat and Barge Fleet Rental Costs at PT Borneo Persada Utama	Similarities with this research on the Independent variable of Financial Capability and the Dependent variable of Fleet Rental Costs	There are research objects carried out at PT Borneo Persada Utama	H3
4	(Mandaku, 2022)	Variable Cost Structure and Vehicle Operational Costs on Fleet Rental Costs in Maluku Province	Similarities with this research on the Independent variable Cost Structure and the Dependent variable Fleet Rental Costs	The difference in other independent variables is Vehicle Operating Costs	H4

## Discussion

Based on the background, problem formulation, research objectives and the results of previous research above, the discussion in the research which focuses on the cost of renting a fleet of ships is as follows:

### 1. The Impact of Market Uncertainty on Fleet Charter Costs

Based on a literature review and relevant previous research, it is known that market uncertainty impacts fleet charter costs.

When fleet charter costs increase, charterers and shipping company managers must pay attention to four indicators of market uncertainty: 1) Fuel price volatility: In this situation, charterers should be aware that shipowners tend to transfer the risk of fuel volatility into the charter rate structure through bunker adjustment factor (BAF) clauses or fuel surcharges; 2) Changes in cargo demand: If demand is predicted to decline, management should avoid long-term charter contracts to avoid being trapped by high fixed costs while vessels are idle; 3) Geopolitical risk: Geopolitical risks include armed conflict, international sanctions, the closure of strategic shipping lanes (such as the Strait of Hormuz, the Suez Canal, or the Red Sea), and changes in international trade policies that can suddenly disrupt global logistics flows. 4) Currency exchange rate volatility: Management must hedge or negotiate contracts in more stable currencies to protect profit margins from exchange rate fluctuations.

If fleet charterers or shipping company managers are able to pay attention to four indicators of market uncertainty, this will impact fleet charter costs, including: 1) Charter rates: High market uncertainty is usually accompanied by increased charter rates as shipowners demand compensation for risk. However, astute management can capitalize on oversupply during uncertain markets to obtain rates below average market rates; 2) Charter contract duration: Uncertainty forces charterers to be more flexible. This results in a shift from time charters (long-term) to spot charters (per voyage) to avoid long-term commitments in volatile markets, even though spot rates tend to be higher on average; 3) Additional operational costs: Responding to uncertainty (such as geopolitical route changes) will trigger additional costs such as emergency port fees, additional crew costs, and additional fuel consumption. Anticipatory management can lock in these costs through all-in contract negotiations. 4) Fluctuations in charter rates: Charter rates are heavily influenced by global indices such as the

Baltic Dry Index (BDI). Understanding market indicators allows managers to time the market when to enter or exit charter contracts to avoid extreme volatility that could harm the company's financial position.

The results of this study align with previous research conducted by (Pangesti et al., 2025), which states that there is an influence between market uncertainty and the cost of renting a fleet of ships.

## **2. The Effect of Freight Rates on Fleet Charter Costs**

Based on a literature review and relevant previous research, it is known that freight rates influence fleet charter costs.

When fleet charter costs increase, charterers or shipping company managers must pay attention to four freight rate indicators: 1) Freight rate per cargo unit: Management must monitor fluctuations in freight rates per ton or per TEU in real time. If market freight rates are high, management has an economic justification for chartering additional fleets even if vessel charter rates are rising; 2) Market rate competitiveness: Management must reduce fleet charter costs by seeking more efficient vessels or renegotiating charter contracts; 3) Surcharges and additional costs: Management must be diligent in implementing additional costs such as Bunker Adjustment Factor (BAF), Peak Season Surcharge (PSS), or Congestion Surcharge; 4) Long-term contract stability: Securing long-term shipping contracts (Contracts of Affreightment) with shippers. Providing cash flow certainty for management to boldly make long-term vessel charter decisions (Time Charter), which typically have more stable rental rates than the spot market.

If vessel charterers or shipping company managers are able to pay attention to four shipping rate indicators, this will affect fleet charter costs, including: 1) Charter rate level: When freight rates rise, demand for vessel space increases, which automatically drives up charter rates. Management with profitable cargo contracts will be more able to pay higher charter rates to maintain market share; 2) Charter contract duration: If shipping rates are predicted to remain stable and high for a long period, management tends to lock in charter costs through long-term contracts (Period Charter) to avoid future charter rate increases; 3) Additional operating costs: If shipping rates are very high, management may be willing to pay additional costs (such as expedited loading/dispatch) to make the chartered vessel immediately available for the next voyage, in order to maximize cargo revenue; 4) Fluctuations in the vessel charter index: Management that understands the dynamics of shipping rates can predict charter index movements. When shipping rates begin to show a downward trend, agile management will quickly renegotiate or terminate charter contracts before the vessel charter index falls and traps them in expensive old charter rates.

The results of this study align with previous research conducted by (Tjahjuadi, 2023), which states that there is an influence between shipping rates and the cost of renting a fleet of ships.

## **3. The Influence of Financial Capability on Fleet Charter Costs**

Based on a literature review and relevant previous research, it is known that financial capability influences fleet charter costs.

When fleet charter costs increase, charterers or shipping company managers must pay attention to four indicators of financial capability, including: 1) Company Liquidity: Maintaining the availability of current assets to meet short-term obligations. Ensuring a healthy Current Ratio allows the company to take advantage of vessel charter opportunities on the spot market when prices fall, without being hampered by operational cash flow issues; 2) Debt-to-Equity Ratio: Maintaining a reasonable DER level to boost shipowner confidence. Companies with low debt levels are considered to have a lower risk of default, allowing them to negotiate

more lenient contract terms; 3) Access to Financing: Building good relationships with banking institutions or investors. Financial capability includes the ease of obtaining Letters of Credit (L/C) or bank guarantees; 4) Operational Profitability: Ensuring a positive profit margin from operational activities. Consistent profitability ensures that vessel charter costs are covered by revenue from cargo transportation.

If a vessel charterer or shipping company manager is able to pay attention to four indicators of financial capability, this will impact the cost of chartering vessels, including: 1) Charter rate: Companies with strong financial capability often receive a Low Risk Premium. Shipowners are more willing to offer lower charter rates to charterers with a stable financial reputation than to charterers with high risk; 2) Charter contract duration: Financial capability allows management to strategically choose contract durations. Financially strong companies are able to commit to long-term time charters (3-5 years) when market rates are low, which drastically reduces the average charter cost compared to continuously using the volatile spot market; 3) Additional operating costs: Sound financial management allows companies to incur additional costs (premium fuel or emergency maintenance) without disrupting operational stability; 4) Charter index fluctuations: Financial capability provides market timing capabilities. Financially healthy companies are not forced to charter vessels when the charter index is at its peak. They have the financial capacity to wait until the charter index declines before entering into new contracts, thus achieving optimal cost efficiency.

The results of this study align with previous research conducted by (Saputri & Hergastyasmarwan, 2025), which states that there is an influence between financial capacity and the cost of renting a fleet of ships.

#### **4. The Influence of Cost Structure on Fleet Charter Costs**

Based on a literature review and relevant previous research, it is known that cost structure influences fleet charter costs.

When fleet charter costs increase, charterers or shipping company managers must pay attention to four cost structure indicators: 1) Fixed cost proportion: Optimizing sailing frequency to spread fixed costs across a larger cargo volume (economies of scale), thereby reducing the charter cost per unit of cargo; 2) Variable cost proportion: Conducting fuel efficiency and route audits. If the proportion of variable costs is too high due to inefficient engine performance on chartered vessels, management must be willing to negotiate a charter fee reduction or seek a fleet with better fuel consumption performance; 3) Vessel operational cost efficiency: Management must conduct a technical evaluation of vessels to be chartered. Selecting vessels with efficient operational costs allows management to continue paying slightly higher charter rates to ensure smooth operations; 4) Overhead cost allocation: Streamlining bureaucracy and digitizing vessel monitoring systems. Efficiency in overhead costs provides financial space for companies to allocate more funds to cover rising fleet charter costs without having to drastically increase shipping rates.

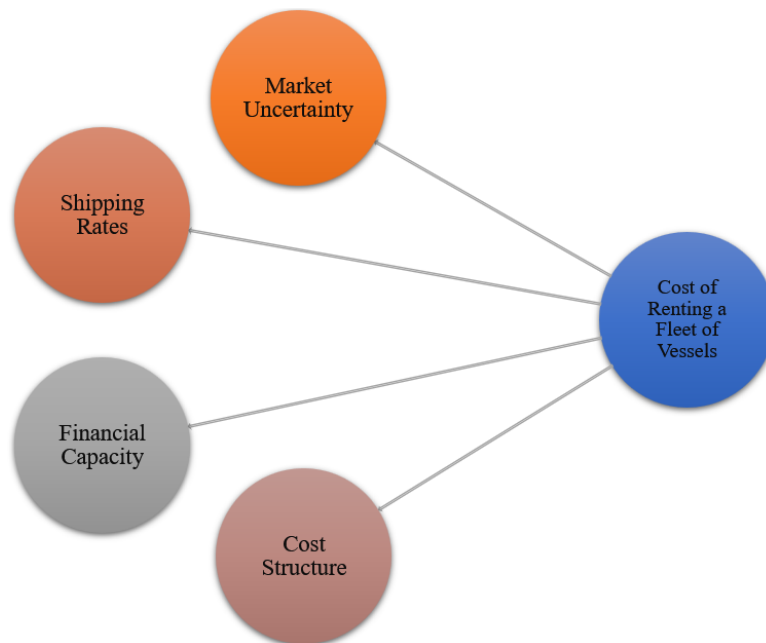
If fleet charterers or shipping company managers are able to pay attention to four cost structure indicators, this will impact fleet charter costs, including: 1) Charter rate: An efficient cost structure provides a wider profit margin. This allows companies to remain competitive in the market for quality vessels even when charter rates are creeping up. Conversely, companies with wasteful cost structures will immediately incur losses even with a small increase in charter rates; 2) Charter contract duration: If a company's fixed costs are already high, management may prefer Trip Charter (short-term) to avoid additional fixed cost commitments; 3) Additional operational costs: A transparent cost structure makes it easier for management to control unexpected costs. With clear cost allocation, additional operational costs (such as extra berthing fees or late fees) can be minimized through more precise schedule planning, supported by the vessel's technical efficiency. 4) Fluctuations in the vessel charter index: When the vessel

charter index fluctuates, management with an efficient cost structure has an advantage in remaining operational under market pressure, while competitors with poor cost structures may be forced to terminate fleet charters.

The results of this study align with previous research conducted by (Mandaku, 2022), which states that there is an influence between the cost structure and the cost of renting a fleet of ships.

### Conceptual Framework

The conceptual framework is determined based on the problem formulation, research objectives, and previous studies relevant to the literature review of this study:



**Figure 2. Conceptual Framework**

Source: Author, 2026

Based on Figure 2 above, market uncertainty, shipping rates, financial capacity, and cost structure influence fleet charter costs. However, in addition to market uncertainty, shipping rates, financial capacity, and cost structure, other variables influence fleet charter costs, including:

- a) Fuel Costs: (Utomo et al., 2025), (Pratama & Paramudhita, 2023), (Y. Dewi et al., 2022).
- b) Government Regulation: (Soekirman, 2024), (Song et al., 2021), (Rakhmawati et al., 2020), (Hermawan et al., 2024).
- c) Insurance Costs: (Harlansyah et al., 2024), (Tazani et al., 2024), (Alfayed & Dewi, 2021), (Puspitasari, 2024).

### CONCLUSION

Based on the problem formulation, results, and discussion above, the conclusions of this literature review using a case study on shipping fleets are: 1) Market uncertainty affects fleet charter costs; 2) Shipping rates affect fleet charter costs; 3) Financial capacity affects fleet charter costs; and 4) Cost structure affects fleet charter costs.

Further research is recommended to use an empirical quantitative approach to test the conceptual model. Furthermore, future research could add other variables such as fuel prices, government regulations, and operational risk to enrich the research model. The use of advanced analytical methods such as SEM or PLS is also recommended to obtain more accurate results.

Cross-country or cross-port research can also be conducted to increase the generalizability of the findings.

This study has several limitations, including the use of secondary data that relies on previous research results and therefore does not directly represent empirical conditions. The number of articles analyzed is limited to 30 sources, so there is still the possibility of other literature that has not been accommodated. Furthermore, this study did not statistically test the relationships between variables, so the results remain conceptual.

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