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FACTORS INFLUENCING THE COMPETITIVENESS OF THE NATIONAL MARITIME FLEET OF VIETNAM

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ABSTRACT

Based on the theoretical foundations related to competitiveness and the national maritime fleet, the author has developed a research model as well as appropriate research hypotheses to analyze the factors affecting the competitiveness of Vietnam's national maritime fleet. Through the results of 262 survey responses, combined with the support of SPSS software, the author obtained reliable results to affirm that factors such as: market demand conditions, supporting and related industries, the maritime industry environment, economic development opportunities, and government management have a positive impact on improving the competitiveness of Vietnam's national maritime fleet.

Keywords: Influencing factors, national maritime fleet, competitiveness

1.0 THEORETICAL BASIS

1.1 Definition of Competitiveness

Competitiveness is a multidimensional and complex concept, encompassing knowledge from various fields such as economics, management, history, politics, and culture, and is studied at multiple levels and perspectives. Competitiveness is synonymous with the economic strength of a country, industry, or individual enterprise (Srivastava et al., 2006). In an ever-changing economic landscape, the survival and success of a nation or organization increasingly depend on competitiveness. As the competitive environment becomes more intense, competitiveness becomes a decisive tool to confront and overcome challenges. Therefore, achieving competitive advantage has become a new goal for many countries today, as it is closely linked to prosperity and directly impacts a nation's economic potential (Bhawsar & Chattopadhyay, 2015).

According to Collins Dictionary, a fleet is “a group of ships operating together” or under the coordination of a specific organization or nation. A maritime fleet may include cargo ships, cruise ships, fishing vessels, military ships, or various other types of ships used for specific purposes. Ships within a fleet often operate together to perform tasks such as transporting goods, safeguarding seas, participating in military activities, or carrying out other operations at sea. Coordination among ships within a fleet is often done to ensure efficiency and safety during operations.

The national fleet is the entirety of vessels flying the flag of a specific nation. For instance, the Vietnamese maritime fleet comprises all ships registered under the Vietnamese flag. As

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previously defined, in this study, the national fleet refers to the group of vessels owned, operated, and controlled by a nation to perform the transportation of goods by sea. The national fleet is a crucial part of a country's maritime transport industry, playing an indispensable role in serving the nation's economy and trade.

A national fleet consists of various types of ships with different sizes, types, and capacities to meet the demand for transporting goods to and from that nation via the sea, as well as participating in international trade. Therefore, a large and high-quality national fleet can create a competitive advantage for that country in the global market, while contributing to national defense, creating employment opportunities, and supporting global economic growth.

1.2 Concept and Role of Competitiveness of the National Maritime Fleet

The competitiveness of a national maritime fleet refers to a country's ability to manage, operate, and develop its fleet in order to compete with the fleets of other nations on the international market. This is demonstrated by the country's ability to maintain and expand the size of its fleet, improve operational efficiency, comply with national and international regulations, and build and strengthen business relationships with various international partners.

The competitiveness of a national maritime fleet determines the success of that country in providing maritime transport services in the global market, reflected in aspects such as transportation speed, competitive pricing, assured quality, and the ability to attract customers internationally. To achieve this, it is crucial to ensure the fleet's operational efficiency, manage maritime assets, protect the environment, and proactively participate in international agreements related to maritime transport. Nations that enhance the competitiveness of their maritime fleets help shape international trade activities, promote economic development, and ensure national security at sea.

The competitiveness of the national maritime fleet plays a crucial role in various aspects. First, it helps promote domestic trade and contributes to international trade by providing high-quality and efficient maritime transport services. This allows the country to engage deeply in the global supply chain, boost import-export activities, and create significant opportunities for domestic enterprises to participate in international trade. As a result, numerous job opportunities arise in sectors such as maritime transport services, ship maintenance, and port management, which contribute significantly to national economic growth. Furthermore, the competitiveness of the maritime fleet helps the country shape international trade models, foster cooperation with various nations worldwide, and advance its national interests on the global stage.

1.3 Factors Creating Advantages for Maritime Transport Enterprises

The ability to manage and operate maritime transport is a key factor in building competitiveness for a national maritime fleet. This capability includes various aspects that directly impact the fleet's ability to monitor operations, maintain vessels, and adapt to changing market conditions effectively and efficiently (D'agostini et al., 2019; Gena et al., 2020). Yeo et al. (2011) provide evidence that operational capacity plays a significant role in the competitiveness of Asian container ports. Effective fleet management and operation are core competencies that greatly influence a fleet's business performance. Good management and operation help reduce operational costs, optimize the use of equipment and facilities, maximize

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the transport capacity of the fleet, thereby increasing revenue and profits, strengthening the company's resources, and enhancing the competitive advantage of the national fleet. Moreover, well-managed fleet operations ensure smooth and efficient service delivery, enhance transport service quality, build the reputation and brand of the national fleet, and consequently, strengthen its international competitiveness (Gena et al., 2020).

The quality of human resources, particularly skilled and dedicated crew members, forms the foundation for the competitiveness of a national maritime fleet. The quality and capacity of the workforce play a crucial role in determining the fleet's ability, competitiveness, and success in the maritime industry (Hetherington et al., 2006).

Operational costs also significantly contribute to building the competitiveness of a national fleet by providing services at reasonable prices, optimizing resources, and enhancing resilience to economic fluctuations. Specifically, lower operational costs help maritime transport enterprises reduce overall service costs and sea freight rates, thereby attracting more customers. In the fiercely competitive international market, the ability to offer maritime transport services at competitive prices is a significant advantage, allowing companies to secure key transport contracts and maintain long-term relationships with customers.

The capacity for alliances and partnerships in maritime transport services helps leverage the strengths and expertise of various members to create collective strength and build a shared competitive advantage for the alliance. This not only optimizes costs but also facilitates brand building and market expansion, thus increasing operational capacity, effectively utilizing the transport potential of the maritime fleet, and improving the business performance of the entire alliance (Chen et al., 2022).

2.0 FACTORS AFFECTING THE COMPETITIVENESS OF THE NATIONAL MARITIME FLEET

2.1 Demand Condition Factors in the Maritime Transport Services Market

Domestic maritime traffic and national transport demand: The domestic demand for maritime transport, essentially the country's import and export needs, plays a crucial role in enhancing the competitiveness of the national maritime fleet. The larger the national demand for goods transport, the higher the profits for the maritime fleet, which contributes to improving business efficiency, accumulating resources, and gaining experience. This helps the national maritime fleet (NMF) enhance its position, reputation, and core capabilities, ultimately increasing its competitiveness in the international maritime transport market. Additionally, fluctuations in national maritime transport demand provide the fleet with a clearer understanding of changes and evolving customer needs. This not only creates pressure but also serves as motivation for the fleet to innovate, improve service quality, and enhance its transport capacity and vessel tonnage, thereby strengthening competitiveness and meeting customer expectations.

International traffic and re-export demand: International maritime transport demand significantly impacts the competitiveness of the NMF. Compared to domestic maritime transport, international shipping orders are generally of higher value, yielding greater revenue for the maritime fleet. This has a profound effect on the fleet’s profitability and business

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performance, allowing it to accumulate more resources for reinvestment in technical improvements and competitiveness.

Demand for multimodal transport and supply chain integration: Multimodal transport involves moving goods using a combination of different transportation modes such as road, sea, rail, and air. This combination helps significantly reduce transportation costs and time by leveraging the strengths of each mode of transport. Multimodal transport and supply chain integration are global economic trends, presenting vast market opportunities and attractive business prospects for the transport sector, including the maritime fleet. However, this demand also requires the NMF to enhance its ability to collaborate with other transport sectors and stakeholders. Additionally, the fleet must improve its management and operational capabilities to ensure smooth, efficient coordination between all involved parties during the transport process. This improved collaboration directly contributes to increasing the competitiveness of the NMF.

2.2 Input Production Condition Factors

Natural conditions: Natural factors, such as geographical location, river systems, and coastline length, play a crucial role in the formation and development of maritime transport routes. Favorable natural conditions give a maritime fleet an advantage in expanding transport routes, developing port systems, and combining with inland waterways to shorten transportation distances and reduce delivery times. This optimization of routes leads to cost savings and ensures timely deliveries, thereby enhancing the quality of transport services and creating a competitive edge for the fleet.

Infrastructure: Infrastructure includes roads, docks, airports, ports, telecommunications systems, electrical grids, and water supplies that facilitate the flow of goods from production sites to consumers. Specifically, port infrastructure—such as warehouses, loading and unloading yards, docking stations, and port communication systems—plays a significant role in the competitiveness of port and maritime transport services (Yeo et al., 2011; Yuen & Thai, 2015). Well-developed infrastructure ensures efficient logistics and reduces bottlenecks in supply chains, contributing to the overall competitiveness of a national maritime fleet.

Shipbuilding industry quality: The shipbuilding industry provides the transport capacity, which is fundamental to the competitiveness of the national maritime fleet (NMF). The quality of the shipbuilding industry significantly impacts the competitiveness of the NMF. Specifically, the quality of the industry determines the ship's tonnage, type, and technology, which, in turn, affect the fleet's capacity, transport speed, operational efficiency, and even operating costs (Cao & Zhang, 2017). A high-quality shipbuilding industry, with advanced technical expertise, skilled labor, and modern equipment, produces ships with large tonnages, modern technology, and efficient operation. This improves the fleet's transport capacity and ability to handle large orders. Ship tonnage and transport capacity are key factors in determining the NMF’s competitiveness in the international market. Additionally, modern technology, especially engines and machinery, enables the fleet to increase speed, reduce transport times, and improve overall service quality.

Access to fuel suppliers: Fuel suppliers provide the necessary fuel for the maritime fleet's operations, and fuel costs account for a significant portion of the fleet's annual operating

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expenses. Therefore, fuel prices from suppliers have a direct impact on input costs and, consequently, on the competitiveness of the NMF. Research has shown that costs are one of the major competitive factors in international maritime transport. Beyond cost, fuel suppliers can also influence the fleet's transport schedules through the time required for refueling at ports, impacting overall efficiency and service quality.

2.3 Related and Supporting Industries

Related and supporting industries provide both inputs and outputs for the operations of the national maritime fleet (NMF), contributing to the value chain of maritime transport services and enhancing the NMF's competitiveness. These industries include port services, maritime services, and logistics services (Cao & Zhang, 2017). The interaction and collaboration among these sectors create synergies that increase the value of maritime transport services, thereby establishing competitive advantages for the NMF. Furthermore, strong relationships between the fleet and supporting industries ensure sustainable competitive advantages. Without the participation of these industries, the fleet would be heavily dependent on external suppliers, facing higher risks and losing the ability to innovate and improve productivity and service quality—key factors that significantly influence the NMF's competitiveness. The following supporting industries directly impact the competitiveness of the maritime fleet:

Quality of port services: Ports and maritime service equipment form the backbone of maritime operations and are essential for maintaining a competitive edge in the global shipping industry. Modern ports go beyond traditional docking functions, acting as comprehensive service providers that facilitate vessel arrivals, manage berthing, and offer critical maintenance and repair services for both ships and their cargo (Baştuğ et al., 2022). The quality of port services is reflected in the port's capacity to handle ships (types, sizes, and the number of vessels that can be docked), cargo handling capacity (throughput, quality, and speed of loading/unloading), and port fees. These factors directly influence the competitiveness of the NMF through reduced costs, shorter transport times, faster cargo handling, and more reliable schedules. In particular, a port's ability to accommodate various types of ships and efficiently handle cargo has a significant impact on the national fleet's competitiveness (Gordon et al., 2005).

Quality of maritime services: High-quality maritime services are essential for improving the NMF's competitiveness by ensuring safe and efficient cargo transport. Regular maintenance, strict technical inspections, and adherence to international safety regulations minimize risks of accidents, cargo damage, and transport delays. Such safety and reliability enhance customer trust, helping maritime companies maintain a strong reputation and competitive position in the global market.

Quality of inland road transport: Inland road transport is closely linked with maritime transport, facilitating the distribution of goods from suppliers to ports and from ports to receivers. This is a crucial component that adds value to the NMF's transport services. Value-added services are a key determinant of international competitiveness for the NMF, as they create seamless logistics solutions that meet customer expectations.

Quality of warehouse logistics: In the maritime transport value chain, warehousing services are responsible for the storage and preservation of goods at departure and arrival points. Similar to inland road transport, warehousing adds value to the NMF's transport services, thus

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significantly influencing its competitiveness on the international stage. Specifically, high-quality warehousing ensures modern storage facilities equipped to maintain the quality and integrity of goods during transit. This is especially important for sensitive goods, such as perishable products with short shelf lives that require specialized handling and storage (Mehrzadegan et al., 2022).

2.4 Economic and International Development Opportunities

Economic openness: Measured by the ratio of total foreign trade value (including exports and imports) to the national GDP, economic openness affects market size, the vibrancy of international trade activities, and the level of global integration. A higher level of openness leads to an increase in international maritime transport demand, contributing to the growth of the national maritime fleet (NMF).

Domestic economic environment: A stable and growing domestic economy positively impacts societal consumption demand, which in turn stimulates production and business activities. This increases demand for maritime transport (both domestic and international) across a variety of goods, from raw materials and machinery to consumer products (Vukić & Cerbán, 2022).

International economic environment: A stable global economy creates favorable conditions for national economic development and fosters international integration, such as participation in global value chains, expansion of export-import activities, and international market growth. As global economic activities thrive, the demand for international transport, including maritime transport, increases, presenting both opportunities and challenges for the NMF.

International trade cooperation: International trade directly influences maritime transport demand. As export-import activities expand, the need for international transport services grows, increasing the demand for maritime shipping. Conversely, a decline in international trade leads to reduced transport demand, affecting the profitability of the NMF. Economic integration and globalization have driven the proliferation of Free Trade Agreements (FTAs), which promote international trade, thereby boosting the demand for maritime transport and creating new business opportunities for the NMF.

2.5 State Management Factors for Maritime Transport

The factors influencing maritime transport, as discussed above, are subject to state management through the implementation of legal frameworks, policies, and institutional regulations. These actions either foster or hinder the development of maritime transport, indirectly affecting the competitiveness of the NMF. Additionally, the state directly impacts the NMF's competitiveness by creating the operational and competitive environment for the maritime industry. Effective governance establishes a free and fair legal environment for all businesses, encouraging healthy competition among enterprises, and fostering sustainable competitive advantages for the NMF. Conversely, weak governance results in market imbalances, reducing competitiveness and hindering the sustainable development of both the fleet and the maritime transport industry (Bilbao-Ubillos et al., 2021).

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Maritime policy framework: National legal regulations guide and control the business activities of the maritime transport industry. Researchers have shown that governmental policies significantly influence the competitiveness of the shipbuilding industry and port services. For instance, government subsidies are a critical factor in determining the international competitiveness of the NMF.

Investment and business environment in maritime transport: Factors such as industry planning, legal regulations on business operations, transportation laws, administrative procedures, and legal frameworks on ownership and business contracts shape market entry barriers and the level of domestic market competition. A challenging business environment restricts the NMF's growth, thereby diminishing its competitive strength. On the other hand, a favorable business environment, with lower risks and reduced operating costs, enables the NMF to enhance its internal capacity, optimize operational efficiency, and compete internationally (Ng & Gujar, 2009).

Foreign policy and international relations: A nation's foreign policy and international relations determine its role and standing within the global community. Strong diplomatic relationships and favorable trade agreements can enhance the NMF's access to international markets and reduce trade barriers, supporting the fleet's expansion and global competitiveness. Conversely, strained international relations may limit market access and increase the risks and costs associated with maritime transport operations.

3.0 RESEARCH MODEL AND HYPOTHESES ON THE IMPACT OF FACTORS AFFECTING THE COMPETITIVENESS OF THE NATIONAL FLEET

3.1 Research Hypotheses

The factors related to the structure, strategy, and core competencies of the fleet influence input costs, service rates, service quality, operational productivity, and the business efficiency of the national fleet. Therefore, hypotheses on the impact of the shipping industry's factors can be proposed as follows:

Hypothesis H1: The factors of the national and global shipping service industry have a positive impact on the competitiveness of the national fleet.

The factors of the shipping service market demand conditions determine the size of the shipping market and thus have a significant impact on the business performance of the national fleet. For this reason, the following hypothesis can be proposed:

Hypothesis H2: The factors of market demand conditions have a positive impact on the competitiveness of the national fleet.

The factors of production input conditions are fundamental in forming, maintaining, and developing the national fleet. Moreover, the production input conditions, such as human resources and infrastructure, have a significant influence on the costs and quality of shipping services, which in turn strongly impact the business performance and resources of the national fleet. Therefore, the hypothesis on the impact of production input conditions is proposed as follows:

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Hypothesis H3: The factors of input conditions have a positive impact on the competitiveness of the national fleet.

The factors of supporting and related industries have a significant impact on the operating costs of the national fleet and play a decisive role in the quality of transport stages, creating added value for maritime transport services. Thus, they strongly affect the competitiveness of the national fleet. On the other hand, the development of supporting and related industries will reduce the dependence of the national fleet on foreign suppliers, thereby minimizing business risks, especially monopoly-related risks, which can lead to price increases and supply shortages, hindering the operations of the national fleet. Based on this, the impact of supporting and related industries on the competitiveness of the national fleet can be argued as follows:

Hypothesis H4: The factors of supporting and related industries have a positive impact on the competitiveness of the national fleet.

The factors of economic development opportunities play a decisive role in the environment and objective conditions for the development of industries in general and the maritime transport industry in particular. Therefore, they have a significant influence on the national fleet. The author proposes the following hypothesis regarding the impact of economic development opportunities:

Hypothesis H5: The factors of economic development opportunities have a positive impact on the competitiveness of the national fleet.

The factors of state management have a substantial influence on the domestic and global economic and political stability, which are extremely important conditions for creating a safe and stable environment for maritime transport business. Therefore, it can be said that state management factors directly affect the business activities as well as the competitiveness of the national fleet. The author proposes the following hypothesis regarding the impact of state management factors on the competitiveness of the national fleet:

Hypothesis H6: The factors of state management have a positive impact on the competitiveness of the national fleet.

3.2 Research Model

From the above theories about the factors affecting the competitiveness of the national fleet, the proposed research model is as follows:

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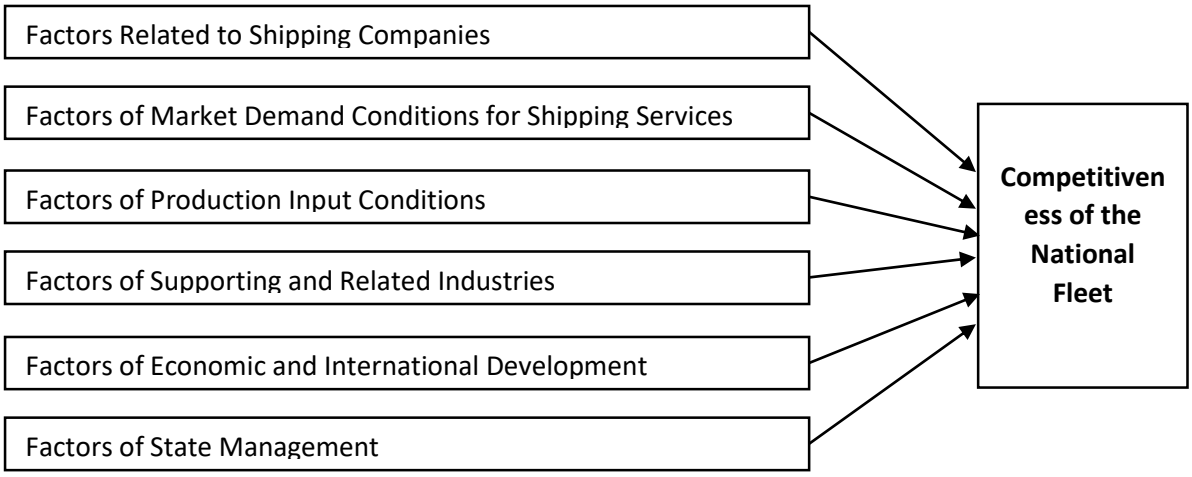

Source: Proposed by the author

Figure 1: Theoretical Research Model

Based on the research model, the regression equation is determined as follows:

$$NLCT = \beta0 + \beta1DKDV + \beta2DKTT + \beta3CNHT + \beta4NVTB + \beta5CHPT + \beta6QLNN + \varepsilon$$

Where:

- **NLCT:** Competitiveness of the national fleet of Vietnam;
- **β0, β1, …, β6:** Coefficients to be determined;
- **DKDV, DKTT, CNHT, NVTB, CHPT, and QLNN:** Respectively represent the factors affecting input conditions, market demand conditions, supporting industries, shipping industry environment, economic development opportunities, and state management activities in the shipping industry in Vietnam;
- **ε:** Standard error.

4.0 RESEARCH METHODOLOGY

After proposing the hypotheses and research model, the author developed a set of measurement scales for this study. The author used a convenience sampling method, conducted in the form of printed and directly distributed questionnaires, along with online surveys via Google Forms. The number of responses collected was 262, including 14 maritime transport researchers (accounting for 5.34%), 9 state management officials in maritime transport (3.44%), and primarily shipping companies (239 companies, accounting for 91.22%). The research sample also shows a clear distribution in terms of company size and operational sectors. Among the 239 participating shipping companies, 30.54% own fewer than 3 ships, while 13.81% are large-scale companies with 10 or more ships. Regarding transport routes, 50.21% of the companies operate in both domestic and international markets, demonstrating the ability to meet various transport demands. Additionally, the transport volume of the companies reflects a significant difference, with 41.84% of the companies handling 5 million tons or more. From these data, a comprehensive overview of the current state of the national fleet is evident, providing a basis for analyzing the factors affecting the competitiveness of the national fleet.

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5.0 RESULTS

5.1 Exploratory Factor Analysis (EFA)

• For the independent variables

The results of the Exploratory Factor Analysis (EFA) using SPSS for the independent variables indicate that the research sample is highly suitable for factor analysis. The KMO index is 0.838, exceeding the minimum required threshold of 0.5, showing that the data is good enough for factor analysis. Additionally, Bartlett's Test of Sphericity has a Chi-Square value of 3601.388 with a significance level of Sig = 0.000, confirming that the variables are correlated with each other and are suitable for continuing the EFA.

Table 1: Results of Exploratory Factor Analysis (EFA)

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.838
Bartlett's Test of Sphericity	Approx. Chi-Square	3601.388
	df	276
	Sig.	0.000

Total Variance Explained

	Initial Eigenvalues			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.336	26.402	26.402	4.066	16.943	16.943
2	3.200	13.334	39.736	3.284	13.685	30.629
3	2.682	11.176	50.913	2.652	11.049	41.678
4	1.873	7.804	58.717	2.588	10.784	52.462
5	1.636	6.817	65.534	2.354	9.810	62.272
6	1.438	5.992	71.526	2.221	9.254	71.526

Rotated Component Matrix[a]

	Component					
	1	2	3	4	5	6

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NVTB4	0.816					
NVTB5	0.812					
NVTB1	0.784					
NVTB6	0.757					
NVTB2	0.741					
NVTB3	0.738					
CNHT2		0.907				
CNHT4		0.893				
CNHT1		0.860				
CNHT3		0.655				
CNHT5		0.597				
CHPT4			0.876			
CHPT1			0.862			
CHPT2			0.670			
CHPT3			0.525			
QLNN3				0.890		
QLNN1				0.862		
QLNN2				0.849		
DKTT1					0.899	
DKTT2					0.851	
DKTT3					0.807	
DKDV3						0.815
DKDV2						0.781
DKDV1						0.781

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 6 iterations.

Component Transformation Matrix

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Component	1	2	3	4	5	6
1	0.659	0.411	0.451	0.200	0.178	0.349
2	-0.219	-0.362	-0.010	0.659	0.597	0.171
3	-0.548	0.777	0.080	0.259	0.028	-0.146
4	0.062	0.278	-0.605	-0.409	0.549	0.292
5	0.462	0.129	-0.494	0.409	-0.041	-0.597
6	0.024	-0.046	0.424	-0.353	0.555	-0.621

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

Source: Data processed using SPSS

The results of the EFA show that all the Initial Eigenvalues of the 6 factors are greater than 1, specifically ranging from 1.438 to 6.336, which fully meets the factor extraction criteria in exploratory factor analysis. The total variance explained analysis indicates that 6 factors were extracted, with the total variance explained being 71.526%. This means that these 6 factors explain more than 71.5% of the variation in the observed variables, which is relatively high and ensures that the extracted factors are meaningful for further analysis. These factors include groups related to shipping capacity, supporting industries, state management policies, and economic and service-related factors, with the factor loadings of the observed variables all exceeding 0.5, indicating a strong relationship between the variables and their corresponding factors.

• For the dependent variable

The results of the EFA for the dependent variable—the competitiveness of the national fleet—using SPSS show that the research sample meets the suitability standards for analysis. The KMO index is 0.758, higher than the minimum required threshold of 0.5, indicating that the data is suitable for conducting EFA. Bartlett's Test of Sphericity has a Chi-Square value of 436.701 with a significance level of Sig = 0.000, confirming that the observed variables are correlated with each other, meeting the necessary conditions for factor analysis.

Table 2: Results of Exploratory Factor Analysis (EFA) for the dependent variable

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.758
Bartlett's Test of Sphericity	Approx. Chi-Square	436.701
	df	10
	Sig.	0.000

Items	Factor loading	Eigenvalue	Cumulative (%)	Cronbach's Alpha
Competitiveness		2,847	56,934	0,806
NLCT1	0,806			
NLCT2	0,804			
NLCT3	0,763			
NLCT4	0,752			
NLCT5	0,634			

Source: Data processed using SPSS

The factor analysis extracted one principal factor with an Eigenvalue of 2.847 > 1, and the total variance explained is 56.934% of the variance of the entire dependent variable, indicating that this factor can explain the majority of the variation in the observed component variables. The observed variables related to competitiveness all have factor loadings greater than 0.6, with the highest value being 0.806 (NLCT1), demonstrating that these variables strongly contribute to the principal factor. The Cronbach's Alpha coefficient of 0.806 also shows high reliability of the scale, ensuring the internal consistency of the observed variables in measuring competitiveness.

5.1.2 Confirmatory Factor Analysis (CFA)

The results of testing the measurement scales in the study using Confirmatory Factor Analysis (CFA) provided strong evidence of the reliability of these scales. Firstly, all Cronbach's Alpha indices are greater than 0.7, indicating high stability and consistency among the observed variables in each scale. Specifically, the Cronbach's Alpha values, such as 0.779 for input condition factors (DKDV), 0.853 for market demand conditions (DKTT), and 0.887 for the shipping industry environment (NVTB), exceed the required threshold, demonstrating that these scales not only have high reliability but also reflect the strong correlation between the observed variables. This ensures that the measurement variables consistently reflect a specific concept, thus enhancing the reliability of subsequent analysis results.

Table 3: Results of Confirmatory Factor Analysis (CFA) for the research variables

Items	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1. **Input condition factors** (DKDV): *KMO = 0,702; Cronbach's Alpha = 0,779;* Total Variance Explained = *69,459%*				
DKDV1	7.31	2.928	0.625	0.693
DKDV2	7.06	3.026	0.596	0.724
DKDV3	7.13	3.137	0.630	0.689
2. **Market demand condition factors** (DKTT): *KMO = 0,723; Cronbach's Alpha = 0,853;* Total Variance Explained = *77,346%*				
DKTT1	6.23	3.480	0.762	0.759
DKTT2	6.14	3.884	0.726	0.794
DKTT3	5.67	3.893	0.689	0.828
DKTT1	6.23	3.480	0.762	0.759
3. **Factors related to supporting and related industries** (CNHT): *KMO = 0,806; Cronbach's Alpha = 0,862;* Total Variance Explained = *65,683%*				

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CNHT1	11.65	12.657	0.744	0.816
CNHT2	11.93	12.011	0.850	0.788
CNHT3	11.98	14.467	0.534	0.867
CNHT4	11.56	12.692	0.784	0.807
CNHT5	11.85	13.777	0.520	0.876
4. **Factors related to the shipping industry environment** (NVTB): *KMO = 0,851; Cronbach's Alpha = 0,887;* Total Variance Explained = *64,185%*				
NVTB1	15.65	24.789	0.713	0.866
NVTB2	15.67	25.670	0.628	0.880
NVTB3	15.96	25.335	0.694	0.869
NVTB4	15.88	24.506	0.762	0.858
NVTB5	16.25	23.651	0.724	0.865
NVTB6	16.23	25.097	0.700	0.868
5. **Economic development opportunities** (CHPT): *KMO = 0,744; Cronbach's Alpha = 0,834;* Total Variance Explained = *66,831%*				
CHPT1	10.91	8.198	0.747	0.751
CHPT2	10.50	8.741	0.655	0.794
CHPT3	10.54	10.165	0.518	0.848
CHPT4	10.60	8.134	0.742	0.753
6. **Government management factors** (QLNN): *KMO = 0,729; Cronbach's Alpha = 0,876;* Total Variance Explained = *80,304%*				
QLNN1	6.65	4.000	0.753	0.834
QLNN2	6.83	4.212	0.728	0.855
QLNN3	6.53	4.135	0.807	0.786
7. **Competitiveness of the national shipping fleet** (NLCT): *KMO = 0,758; Cronbach's Alpha = 0,806;* Total Variance Explained = *56,934%*				
NLCT1	13.54	14.655	0.472	0.808
NLCT2	13.06	14.298	0.608	0.764
NLCT3	13.56	13.902	0.652	0.751
NLCT4	13.52	14.143	0.596	0.767
NLCT5	13.45	13.881	0.644	0.753

Source: Data processed using SPSS.

Additionally, the KMO & Bartlett tests also demonstrate the suitability of the data for conducting Exploratory Factor Analysis (EFA). With KMO values ranging from 0.702 to 0.851, such as 0.744 for economic development opportunity factors (CHPT) and 0.758 for the competitiveness of the national shipping fleet (NLCT), combined with the Bartlett test being statistically significant at the 95% level, this confirms that the data is adequate for factor analysis. More importantly, the total variance extracted for the first factor of each scale exceeds the 50% threshold, such as 80.304% for government management factors (QLNN) and 69.459% for input condition factors (DKDV). This indicates that these factors can explain more than 50% of the variation in the observed variables, thereby reinforcing the explanatory value of the model. With these results, it can be affirmed that the scales have been developed with high reliability and value, laying the groundwork for subsequent linear regression analysis to test the model and research hypotheses.

5.2 Model Testing and Research Hypotheses

5.2.1 Correlation Analysis

The results of the Pearson correlation coefficient analysis between the independent variables obtained from SPSS indicate that all correlation coefficients are less than 0.7, ensuring that there is no multicollinearity among the independent variables. Specifically, the largest observed

correlation coefficient is 0.465 between the shipping industry environment factor (NVTB) and the economic development opportunity factor (CHPT), still below the 0.7 threshold. Other variable pairs also exhibit much lower correlation coefficients, such as the correlation between input condition factors (DKDV) and market demand condition factors (DKTT) being 0.246, and between the supporting industry (CNHT) and economic development opportunity (CHPT) being 0.323. This indicates that the relationship between the independent variables is moderate and not too high, thereby ensuring that these variables do not strongly correlate with one another. This result is crucial as it eliminates the risk of multicollinearity in the regression model, helping to ensure the accuracy and reliability of regression estimates in subsequent analyses.

Table 4: Pearson Correlation Analysis for Independent Variables

	DKDV	DKTT	CNHT	NVTB	CHPT	QLNN
DKDV	1	0,246**	0,181**	0,348**	0,344**	0,194**
DKTT		1	0,033	0,107	0,123*	0,342**
CNHT			1	0,260**	0,323**	0,069
NVTB				1	0,465**	0,077
CHPT					1	0,201**
QLNN						1

* Significant at p=0.05, n=262
** Significant at p=0.01, n=262

Source: Results processed using SPSS

5.2.2 Multiple Regression Analysis for Model Testing

The results of the regression analysis are presented in the table below, which confirms the reliability of the proposed overall research model. Specifically:

Table 5: Results of Multiple Regression Analysis

Model Summary[b]

Model	R	R Square	Adjusted R Square	Durbin-Watson
1	.711[a]	0.506	0.495	2.078

ANOVA[a]

Model		Sum of Squares	df	F	Sig.
1	Regression	132.102	6	43.556	.000[b]

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Residual	128.898	255			
Total	261.000	261			

Coefficients[a]

Model		Unstandardized Coefficients		t	Sig.	Collinearity Statistics	
		B	Std. Error			Tolerance	VIF
1	(Constant)	0.000000000000000143	0.044	0.000	1.000		
	DKDV	0.084	0.049	1.706	0.089	0.792	1.263
	DKTT	0.153**	0.048	3.197	0.002	0.849	1.178
	CNHT	0.149**	0.047	3.177	0.002	0.877	1.140
	NVTB	0.312***	0.051	6.064	0.000	0.732	1.367
	CHPT	0.311***	0.053	5.889	0.000	0.694	1.442
	QLNN	0.102*	0.048	2.135	0.034	0.851	1.176

* Significance level p < 0.05
** Significance level p < 0.01
*** Significance level p < 0.001

Source: Data processed by SPSS

- The VIF values of all variables are less than 2, confirming that there is no multicollinearity among the independent variables, ensuring the reliability of the regression analysis results.

- The R^2 coefficient = 50.61% (> 50%), indicating that the multiple regression model can explain 50.61% of the total variance in the model. This confirms that the multiple regression model is appropriate for the collected data, accurately reflecting the impact of factors affecting the competitiveness of the national fleet.

- The F-statistic = 43.556 with Sig = 0.000 shows that the regression model is statistically significant overall, meaning that it can be used to explain and predict the real impact of factors affecting the competitiveness of the national fleet.

- Notably, the Durbin-Watson coefficient = 2.078, close to the ideal value of 2, indicates that there is no autocorrelation among the residuals in the model, ensuring the accuracy of the regression estimates.

- The multiple regression equation is expressed as follows:

Y = 0,000000000000000143 + 0,084*DKDV + 0,153*DKTT + 0,149*CNHT

+ 0,312*NVTB + 0,311*CHPT + 0,102*QLNN

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5.2.3 Hypothesis Testing

- The input condition factor does not have a significant impact on the competitiveness of the national fleet at the 95% confidence level (B = 0.084, Sig. = 0.089). Therefore, hypothesis H1 is not supported.

- The market demand condition factor positively impacts the competitiveness of the national fleet at the 95% confidence level (B = 0.153, Sig. = 0.002). Thus, hypothesis H2 is confirmed: the better the market demand conditions, or in other words, higher market demand contributes to improving the competitiveness of Vietnam's national fleet.

- The supporting and related industry factor positively impacts the competitiveness of the national fleet at the 95% confidence level (B = 0.149, Sig. = 0.002). This result confirms hypothesis H3.

- The maritime transport sector environment factor positively impacts the competitiveness of the national fleet at the 95% confidence level (B = 0.312, Sig. = 0.000). Thus, hypothesis H4 is confirmed: the better the maritime sector environment, the higher the competitiveness of Vietnam's national fleet.

- Economic development opportunities positively impact the competitiveness of the national fleet at the 95% confidence level (B = 0.311, Sig. = 0.000). This result confirms hypothesis H5: domestic and international economic development opportunities contribute to enhancing the competitiveness of Vietnam's national fleet.

- The state management factor positively impacts the competitiveness of the national fleet at the 95% confidence level (B = 0.102, Sig. = 0.034). Thus, hypothesis H6 is confirmed: the more favorable state management factors are, the higher the competitiveness of Vietnam's national fleet.

6.0 CONCLUSION

Through analyzing the factors affecting the competitiveness of the national fleet, we can determine the degree of influence each factor has on the fleet's competitiveness. This is also a crucial foundation for the author to propose recommendations and policy implications aimed at strengthening the advantages and mitigating weaknesses, thereby contributing to the continuous enhancement of the competitiveness of Vietnam's national fleet.

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Research Scale

Independent variables	Legend	Source
1. Input Conditions for Production	DKDV	Porter (1990), Hetherington et al (2006), Gordon et al (2005), Progoulaki và Theotokas (2010)
1.1. Human Resources	DKDV1	
1.2. Geographical Location	DKDV2	
1.3. Infrastructure for Maritime Transport	DKDV3	
2. Market Demand Conditions for Maritime Transport Services	DKTT	Lee et al (2014), Song and Dong, (2012), Yang (2014), Ng and Gujar (2009)
2.1. Domestic Maritime Transport Demand	DKTT1	
2.2. International Maritime Transport Demand	DKTT2	
2.3. Demand for Multimodal Transport and Supply Chain Integration	DKTT3	
3. Supporting and Related Industries	CNHT	Song and Dong, (2012), Cao and Zhang (2017), Baso et al (2020), Baştuğ et al (2022), Kim et al (2022), Mehrzadegan et al (2022)
3.1. Access to Fuel Suppliers	CNHT1	
3.2. Quality of Port Services	CNHT2	
3.3. Quality of the Shipbuilding Industry	CNHT3	
3.4. Quality of Domestic Land Transport	CNHT4	
3.5. Quality of Warehousing and Logistics Services	CNHT5	
4. Maritime Industry Environment	NVTB	Lee et al (2014), Yeo et al (2011), Sys (2009), Álvarez-SanJaime et al (2013), Arslan and Papageorgiou (2017), Chen et al (2022), Gena et al (2020),
4.1. Transport Capacity of the Fleet	NVTB1	
4.2. Management and Operation Capacity of the Fleet	NVTB2	
4.3. Competition and Price Volatility in Maritime Transport Services	NVTB3	

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4.4. Capacity for Alliances and Partnerships in Maritime Services	NVTB4	Kuo et al (2017), Lai et al (2022), Song et al (2023)
4.5. Degree of Vertical Integration	NVTB5	
4.6. Technology in Fleet Operations	NVTB6	
5. Economic Development Opportunities (National and International)	CHPT	Vukić and Cerbán (2022), Chen et al (2021)
5.1. Degree of Economic Openness	CHPT1	
5.2. Domestic Economic Environment	CHPT2	
5.3. International Economic Environment	CHPT3	
5.4. International Trade Cooperation	CHPT4	
6. State Management Factors	QLNN	Yang (2014), Ng and Gujar (2009), Bilbao-Ubillos et al (2021)
6.1. Policies and Regulations for the Maritime Transport Sector	QLNN1	
6.2. Investment and Business Environment	QLNN2	
6.3. Foreign Policy and International Relations	QLNN3	

The dependent variable, "Competitiveness of the National Maritime Fleet," is evaluated based on several key determining criteria (Dang Cong Xuong and Nguyen Nam Giang, 2021; Luu Quoc Hung, 2017). Specifically, these criteria include:

- Cost Leadership (more cost efficient): To ensure competitiveness and attract customers, the National Maritime Fleet needs to lead in cost efficiency in maritime transport operations. This capability allows the fleet to offer sea transport services at reasonable and attractive prices for customers.

- Service Competence and Quality (better service competence and quality): The service quality of the National Maritime Fleet is a crucial factor in maintaining and growing loyal customers. Professional and reliable service quality helps the fleet attract international customers and partners.

- Service Specificity and Differentiation (specificity and differentiation of services): The differentiation and specificity of the maritime transport services provided by the National Fleet can serve as a competitive advantage. These specialized services may attract particular partners and customers, creating added value for the fleet.

- Ability to Maintain and Expand Market Share in Maritime Transport: To ensure future development and competitiveness, the ability to maintain and expand market share in the international cargo transport market is critical for the National Maritime Fleet.

- Industry Reputation (industry reputation): The reputation of the national maritime fleet is essential for participating in international transactions and collaborating with reputable partners. It plays a significant role in improving the fleet's standing in the global market.

