



CASH FLOW MANAGEMENT IN MARINE COMMERCIAL SHIPPING

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Abstract. Strong cash flow maintenance is critical in ensuring profitability, investment agility, and long-term competitiveness in the modern maritime business. This presentation explores the financial pressures that faced commercial shipping operators, including volatile freight rates, shifting cargo demand, and rising capital costs associated with fleet upgrades and regulatory compliance.

As traditional revenue streams become less predictable, the focus shifts to optimizing financial performance through better cost control, capital allocation, and strategic investments within and beyond core transport operations. The discussion also highlights the increasing impact of global safety regulations on operational budgets and examines how administrative oversight contributes to maintaining efficiency on key shipping routes.

One of the key strategic challenges addressed is managing risk exposure balance and liability limits with the realities of systemic and non-systemic market disruptions. The conclusions of exploring forward-looking fleet development projects, designed concerning sustainability and performance, can deliver operational gains and significant long-term value for stakeholders.

Keywords: Sustainability; Management; Cash Flow; Merchant Shipping; Investment; Operator Activity.

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1. INTRODUCTION

General principles of economic results formation require differentiation of the role of organizational approaches and innovative technologies implementation in local transport ranges. However, these generalizations often overlook specific challenges of cash flow management in maritime shipping, especially in emerging markets, indicating a gap that this study addresses. This approach assumes the strengthening of the role of cash flow management in conditions of increasing manifestation of external risks and threats in the system of maritime safety. In this context, it is essential to highlight the research problem: shipping companies face growing liquidity pressures, yet literature rarely connects cash flow strategies with these market risks. The latter predetermines the formulation of intermodal technologies features in local transport subsystems, which implies the development of effective implementation principles of institutional and entrepreneurial projects in specialized segments of shipping. Thus, this paper aims to examine how optimized cash flow management can enhance the financial resilience of shipping enterprises, contributing novel insights to both maritime finance theory and practice. By clarifying these relationships, our contribution lies in filling the identified research gap and providing guidance on cash flow optimization for maritime firms.

2. PUBLICATIONS ON THE RESEARCH TOPIC

Despite preserving and even increasing the role of maritime transport in the effective participation of any country in the international division of labor, the role of individual states in the structure of global and regional segments of the maritime trade market has changed significantly over the last twenty years. After the transition of the former Danube countries to a market economy and a decrease in the level of state support for the fleet, most of them, including Ukraine, have completely lost the competitiveness of the fleet. This niche was occupied by the fleet of sub-flag registries, which led to integration problems. This predetermined the need to clarify certain scientific approaches presented in the study (Primachov, 2009). Newer research has extended analysis to cash flow optimization under increased market volatility. Recent industry reports (UNCTAD, 2022) also emphasize that national fleets struggle with financing constraints while investment shifts toward global players, echoing and updating earlier findings.

As criteria for risk profile grouping, the type of vessel, its age, the assessment of the vessel's flag state, the assessment of the company, etc. are not considered.

It is necessary to take into account the tightening of the inspection regime for shipowners and operators to avoid the risk of losing competitive attractiveness for chartering even if the tariff rates are bonified. This observation reflects a gap in linking operational risk factors to financial outcomes, which has been partially addressed in recent supply chain finance studies.

The national fleet is not actually developing, port construction on the basis of foreign investments remains attractive due to low rates of territory lease. In this respect, we can agree with the emphasis on the peculiarities and priority of positioning the national maritime transport potential (UNCTAD, 2019). Additionally, global analyses (UNCTAD, 2022) note similar trends: domestic fleets face capital shortages, while port and infrastructure projects rely heavily on external funding.

Special attention should be paid to the consideration of current problems of functional activities of subsystems of the maritime transport industry (Grammenos, 2010). Along with this, the erroneous statement of the question about the place of Ukraine in the "world transport system" without assessing the parameters of development draws attention. Quantity growth is a standard extensive form of development. Grammenos (2010) highlighted structural inefficiencies in maritime management, and subsequent literature continues this critique by noting that outdated financial practices impede cash flow stability in shipping. Conversely, some recent studies suggest that digital finance solutions could improve liquidity management in this sector.

Leading theoretical approaches relevant to this paper include corporate finance principles (Damodaran, 2012), maritime economic frameworks (Stopford, 2009), and logistics integration theory (Notteboom & Rodrigue, 2013). These frameworks help interpret investment strategies, asset utilization, and financial risk in shipping. Recent research directions diverge on the role of digital technologies, sustainability-linked financing, and resilience-based planning. While some authors argue for state-backed capital programs, others propose liberalization and competitive market incentives as primary solutions. This paper positions itself between these poles by integrating both efficiency-based and strategic policy perspectives.

In summary, the literature on maritime finance and logistics reveals diverging perspectives: some argue that external investment and regulatory support can alleviate cash constraints, while others point to persistent capital intensity issues. By situating our analysis within these discussions, the paper bridges

the gap between financial management theory and specialized maritime practice.

3. RESEARCH OBJECTIVES

In the development of national merchant shipping, it is especially necessary to take into consideration the problem of capital flow management for enterprises at the beginning of the life cycle. As rules, they have limited access to external sources of borrowing, so it is important to have an adequate institutional support system.

Under these conditions, the importance of specifying the features of formation of a new set of factors and regularities of normalization of the fleet's carrying capacity and its structuring according to the criteria of operational and economic adequacy to the parameters of the maritime trade market is expanding (Maclachlan, 2004).

The main thing in the conditions of periodic passivity of the most important sectors of the freight market and growth of the unit capital cost of ships is to optimize the cash flow, taking into account the normalized costs and diversion of funds for the formation of non-transport effect.

At the same time, taking into consideration the strengthening of the conventional regulation role of shipping safety, it becomes fundamental to study the place of administration in the management system of ensuring the reliability of navigation on the main cargo transportation routes of the country's foreign trade.

4. THE MAIN MATERIAL OF THE RESEARCH

Transformation of the management mechanism of functional and investment activity of shipping companies reflects a certain change in the regularities of cargo flows formation, interaction of transport enterprises and increasing role of regional positioning of specialized shipping. These circumstances predetermine the change of requirements to technical reliability of individual ships and development of the base ensuring their safe operation. This description aligns with organizational theory, where such systemic shifts require adaptive management strategies in uncertain environments.

Unfortunately, this process predetermines the tendency of reduction of the return rate on capital. This, in turn, forms the tasks of improving the organization of the shipping companies' fleet operation. In the structure of improvement of the shipping operation organization in the system of ensuring the sustainability of the international division of labor, the

attention should be focused on stabilization of participation in cargo transportation on the principles of pareto-efficiency of all states on the basis of the national interests priority within the synergy effect. This focus on Pareto-efficiency reflects theoretical principles from operations research applied to international logistics.

However, the main challenge of solving this business problem is the limited investment resources, on the one hand, and underestimation of the subsystems of the maritime transportation industry from macro-economic positions in the system of national security. In this regard, the problem of achieving transport independence on the basis of an active maritime policy, on the other hand, stands out (Grammenos, 2010).

In this regard, attention should be paid from the position of economic, environmental and energy-saving strategies to the feasibility of developing combined transportation routes. The use of the principle of transshipment-free operations when changing transportation modes ensures both the reduction of delivery time and the competitive cost-effectiveness of container terminal development projects. In addition, it is important to predetermine not only the reduction of environmental load, but also the optimization of costs in the formation of cargo hubs. Therefore, along with specialized shipping, investment should include the development of transshipment and ferry services for the transportation of TEU and truckloads. This approach is consistent with the triple-bottom-line framework, optimizing economic efficiency alongside environmental impact.

Operator and investment decisions should be based on two forms of standards: system-wide (conventional) and firm (competitive) image standards. The first group performs the functions of a mechanism for managing the balance of the priority segment of the transportation services market for the operator. In case of violation of such a system of regulation, both shipowners and cargo owners suffer losses. The complexity of management lies in the fact that for transport enterprises cargoes are considered as one of the forms of labor items forming both results (freight) revenue and operating costs. For cargo owners, the volume of cargo flow is labor capital diverted from circulation, requiring credit for this period. This notion echoes management theory that distinguishes between macro-level regulations and micro-level competitive benchmarks in strategic decision-making.

Time of delivery is therefore a central concern of shipping companies and cargo owners. The distinction is formed in the nature of time influence on the

performance of one and the other. Time-based competition theory highlights this divergence: carriers focus on minimizing turnaround time, while shippers emphasize reliability of delivery schedules.

In the system of unstable functioning of local segments of the maritime trade and maritime safety market in the short term, the problem of managing the financial stability of a shipping company in the medium term arises.

Therefore, the most important task is to manage cash flows based on the choice of options for utilizing the potential of the fleet's carrying capacity, taking into account the current technical condition of ships. Optimization of cashflow options is taken as a criterion of technical and economic stability management expanding (Maclachlan, 2004). This reflects the fundamental finance principle that optimizing cash flow is key to long-term organizational stability. Logically, the system of management of technical, operational and economic parameters of shipping activity of any scale of concentration can be reduced to a condition reflecting the basic requirements of market theory, requirements of international conventions and innovation activity (Davila, 2006).

Economic parameters of shipping activity:

$$CF_{Sc} = \sum Q_{ij} p_{cij} (1 \pm \gamma_b) \geq \frac{Prb}{(1-t_x)} + C_{SF} + \sum Q_{ij} l_{ij} h_{rk} p_{crk} (1 \pm x) \pm \frac{K_{pn}}{T_L} \quad (1)$$

where:

Q_{ij} – volume of cargo transportation (n), for which tariff or freight rates are clearly differentiated;

p_{cij} – level of expected (segment) tariff rates of cargo transportation on the main routes;

γ_b – coefficient taking into account;

P_{rb} – value of profit after taxation;

t_x – value of the company's profit taxation rate;

C_{SF} – value of fixed costs of the shipping company;

l_{ij} – distance of cargo transportation;

h_{rk} – norm of consumption of resources providing the transportation process and forming variable expenses in the transportation process;

p_{crk} – market price of resources necessary for effective fleet operation;

K_{pn} – capital investments required for realization of the project of innovative development of the shipping company;

T_L – life cycle of the project (capital assets);

x – coefficient that takes into account situational changes in the market of resources or in the technology of their use.

The most important aspect in management is the principle of corporate efficiency on the basis of linking project decisions and management of development programs and sustainability of functional activities. Management of transportation profitability and efficiency of current costs becomes the main one. The principle of effective management of assets and investment resources should be used as a criterion approach. This principle is widely recognized in corporate finance, emphasizing effective asset and investment management as key to firm performance.

When choosing a strategy for the development of national merchant shipping, it is necessary to take into account the formation mechanism of the states' majority of that have achieved leading positions in the global maritime trade market. The transition to active stimulation of the shipping industry ensures the inflow of capital into the national economy. The modern use of the reflagging principle fully confirms the objectivity of the conclusion: "All models of risk and return in finance are based on the interest rate available to investors in risk-free investments ..." (Damodaran, 2012, p. 201). It is important to take into account the nature of balancing the approaches of all stakeholders in the formation of carrying capacity potential. The principle of national interests should be implemented in Ukraine to stimulate investment in the system of specialized maritime shipping. These strategic considerations align with growth models of national merchant fleets, underscoring the role of state incentives and stable financial frameworks.

In the system of transport service of foreign trade relations of the country on the basis of innovative directions of fleet development should be observed "the law of the realization time" (Jobber and Ellis-Chadwick, 2016, p. 51). The average implementation time of any technical or economic process, considered on the basis of Little's law (Jobber and Ellis-Chadwick, 2016, p. 51), is limited by the effective concentration of resources: capital or labor (Fig. 1). Little's law thus provides a quantitative basis for planning resource allocation in shipping operations, linking throughput with cycle time.

For example, in accordance with the average productivity of one deadweight ton of the specialized fleet per day of operation it is necessary to replenish the vessels of the Danube and Dnieper shipping companies within 70 – 80 thousand tons. On this basis it is necessary to form the investment program and choice of shipbuilding base taking into account the normative payback period of capital investments. This quantitative approach aligns fleet renewal with financial benchmarks, providing a basis for strategic investment planning.

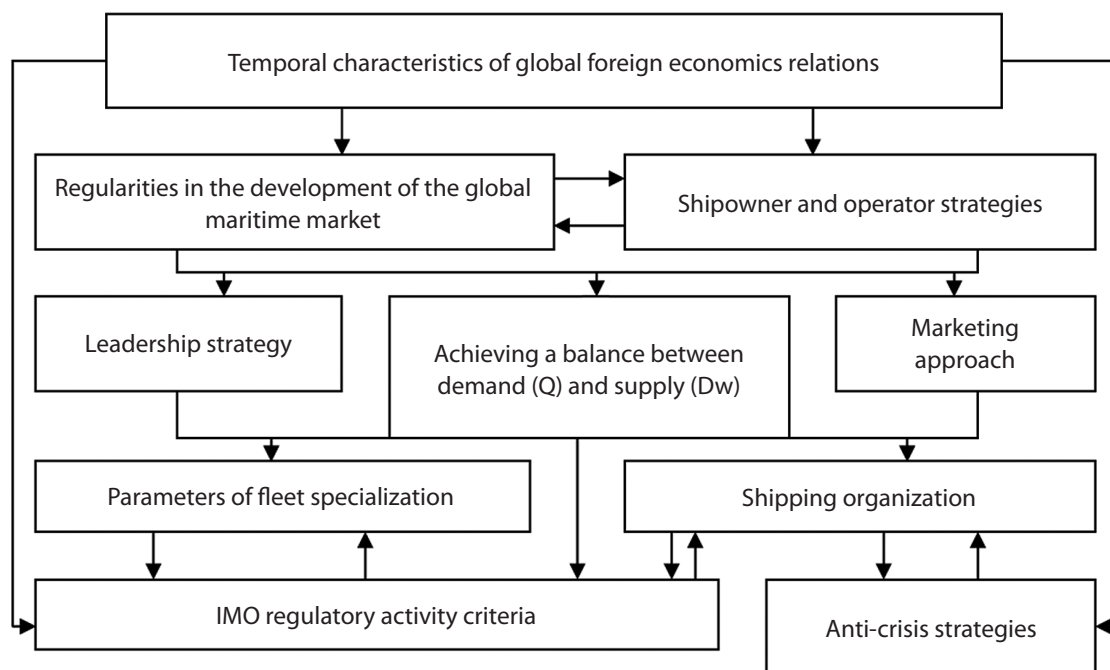


Figure 1. Cash Flow Management in Merchant Shipping.

Building up the potential of the fleet of specialized technologies should meet two limitations: the real scale of demand for transport services and business efficiency of the owners of the shipping company's capital. The control of this process should be based on the management of two flows, on the one hand, the amount of payment for the services provided – the income of the complex, and, on the other hand, the flow of capital providing functional activities of the operators. This dual-flow framework aligns with financial theory that distinguishes revenue inflows from operational capital requirements.

In order to avoid discriminatory approaches in the system of transport development, the most important aspects are the use of integration principles of national transport development in relation to the trends of global world shipping. In this aspect, the creation of coastal shipping segments widely using river integrated shipping routes stands out. This strategy follows logistics integration theory, emphasizing inland waterways to enhance regional transport potential. Exactly according to this strategy, the creation of separate specialized companies without normalized value of working capital predetermined the risk of alienation of high-class ships at the next operational debt for servicing other ships.

With increasing attention to the development of the specialized segment of shipping and the use of

Europe's inland water space, Ukraine should focus on more fully realizing the transport potential of the Dnieper and Danube rivers. This regional emphasis reflects case studies where strengthening inland waterways boosted national shipping capacity.

5. CONCLUSION

In summary, this paper examined cash flow management in merchant shipping and identified that financial optimization plays a crucial role in maritime competitiveness. By integrating concepts from finance and operations management, we find that aligning liquidity planning with fleet investment strategies enhances both safety and profitability of shipping companies. These findings contribute to existing theory by demonstrating how maritime firms can adapt traditional cash flow models to sector-specific constraints. The practical significance of this study lies in guiding managers and policymakers to emphasize liquidity and cost efficiency in their strategic decisions. In conclusion, our analysis underscores that robust cash flow management, coupled with targeted investment, is essential for sustainable shipping operations. Future research should empirically test the proposed framework and explore the impact of emerging factors like green finance and digitalization on maritime cash flow practices.

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