Benchmarking of Intangible Assets in the Shipping Industry

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The purpose of the paper is to develop a methodical approach to benchmarking of intangible assets on the example of the shipping industry in the context of the influence of intangibles on the financial results and market capitalisation of companies. The methodology of the research is based on a systematic approach, theory of benchmarking, financial analysis and assets valuation, theoretical foundations of maritime economics, and finance. The following scientific methods were used in the study: analysis and synthesis of results and retrospective, methods of econometrics, comparative, logic, and analytical methods. A methodical approach to comparative analysis of financial indicators, characterising intangible assets and their interpretation, has been elaborated. The proposed approach is illustrated on the example of container companies. The approach to benchmarking intangibles in the shipping industry makes it possible to perform a statistical analysis of indicators characterising the impact of the value of intangible assets on the financial results of shipping and logistics companies and their market capitalisation. The shipping industry is characterised by a low share of intangible assets, however, the growth in the share of intangibles has shown their importance for improving business efficiency of shipping companies in terms of financial indicators. The growth dynamics of goodwill to assets ratio has demonstrated the intensification of merger and acquisition processes in container sector of liner shipping. The multiples of financial results to the value of intangible assets were supplemented by correlation-regression analysis of dependence of the net profit on the value of intangibles. Analysis of the share of intangible assets in the market capitalisation and Tobin's Q make it possible to assess the impact of the value of intangibles on the market value of companies. The results of analysis of annual Tobin's Q showed the assets of container companies to be slightly undervalued by capital markets.

KEYWORDS
~ Benchmarking
~ Finance
~ Intangible assets
~ Shipping industry
~ Maritime transport
~ Logistic company

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1. INTRODUCTION

Asset research in the shipping industry has always paid great attention to tangible assets, primarily capital-intensive sea vessels, while neglecting intangible assets, the share of which is traditionally relatively small in the industry. Some studies aimed at determining the value of intellectual capital and other types of intangibles of shipping companies have only begun in the last decade. Intangible assets of shipping companies are considered as a source of competitive advantage for logistics service providers, but there are no studies that compare financial indicators to characterise the impact of the share and value of intangible assets on the financial performance of shipping and logistics companies and their market capitalisation.

It is important to prove that despite the great role of traditional tangible assets for the shipping industry, the stable economic development of shipping and logistics companies increasingly depends on intangible assets that generate additional competitive advantages, positively affect profits and market capitalisation. To solve this problem, it is necessary to develop a methodical approach to benchmarking intangible assets, which involves the use of a system of financial indicators.

This study is based on the assumption that the combination of tangible and intangible assets provides growth in operating revenue, financial performance of shipping companies, market capitalization, and value of business. In particular, the positive business reputation of the company is a necessary component of success, which helps to protect the business, affects the attractiveness for customers, partners, investors, the demand for services offered by the business entity, also contributing towards the growth of financial results, the value of shares, and the market value of the company as a whole. Therefore, intangible assets should be analysed as a source of increasing competitiveness in the context of impact on the level of economic efficiency and business value.

All of the above determines the relevance of developing a methodical approach to benchmarking intangible assets in the shipping industry, using financial indicators to analyse the impact of intangibles on the financial results and market capitalisation of companies. To solve these problems, it is necessary to investigate the composition of intangible assets in the industry and propose multiples showing the relationship between financial results and intangible assets, as well as indicators of the impact of intangibles on the market value of companies' equity. This will allow us to offer an original approach to benchmarking intangible assets in the shipping industry, based on the developed system of financial indicators, as well as their statistical analysis and interpretation.

2. REVIEW OF PREVIOUS RESEARCH

Intangible assets are non-physical assets which generate value added to the company in the future. Unlike physical assets, intangible assets are effectively untethered from physical constraints, enabling radically higher potential rates of growth (Gumelar et al., 2018). The intangibles can be defined as the assets that lack physical existence, but include goodwill, patents, brand, copyright, trademarks, trade secrets, licenses and permits, and corporate intellectual property (CFI, 2023).

There are different approaches to classification of intangible assets. The main types of intangibles include brands, goodwill, and intellectual property (Kenton, 2023). Intangible assets can be classified into definite and indefinite by limitation in time. The first category is limited in time, for example, an agreement to use a patent for a certain period is definitely an intangible asset. Indefinite intangibles, such as a brand, remain with the owner as long as he continues to operate the business. In order to determine the remaining useful life for the acquisition of assets or estimate the acquisition cost, intangible assets can be classified depending on the scope of use into: customer-related intangibles – customer contracts and customer relationships; artistic-related intangibles – copyright, domain name, etc.; technology-based intangibles – patented or unpatented technology, computer software, databases, and trade secrets (BVR, 2021).

Goodwill can be considered as a premium paid when a business is acquired (Beers, 2021). If a company is acquired for more than its book value, the acquiring company pays for intangible assets, such as intellectual property, brand recognition, skilled labour and customer loyalty. Business goodwill is an intangible asset that adds value to a company. Goodwill is considered as an intangible asset associated with the acquisition by one company of another (Hargrave, 2023). It is the value that can give the buying company a competitive advantage. A study of the issues of goodwill recognition, measurement, disclosure, and the role of governance and monitoring shows that goodwill is related to the economic and managerial features of the merging companies (Amel-Zadeh et al., 2023).

Currently, intangible assets are the most important drivers of company growth and value (EverEdge, 2021). Indicators for assessing the growth, efficiency and sustainability of intangible assets can be used to evaluate intellectual capital and monitor the intangibles of a shipping company (Giudice and Paola, 2017). The specific nature of transport services and the desire to reduce costs have a significant impact on the operational activities of logistics companies, and intangible assets represent the main source of competitive advantage for transport companies (Kawaa and Anholcer, 2018).

A company's financial performance should be modelled on the basis of many variables taking into account the characteristic features of maritime transport (Bazaluk et al., 2022).

Benchmarking of intangibles can be implemented in the development of teamwork to determine the productivity of personnel through self-assessment and comparative analysis of personnel (Castka et al., 2004). Intangible assets based metrics can help managers and investors to assess equity and value of a company (Feng and Baruch, 2011). Benchmarking is an important strategic business tool for creating a sustainable competitive advantage that goes beyond the operational level and moves to a wide range of value chains, strategic, operational, and project levels (Hong et al., 2012). Econometric analysis can be used to study the impact of intangible assets on the performance of companies (Lukic & Vojteski Kljenak, 2017).

A review of recent publications shows the importance of intangible assets for the competiveness of companies. Benchmarking the indicators of intangible assets of shipping and logistics companies and their impact on financial results and equity value compared to competitors can provide additional information to create a competitive advantage in order to increase competitiveness and financial performance of companies in the shipping market.

3. METHODOLOGY AND DATA

The methodology of the research is based on a systematic approach, theory of benchmarking, methodological approaches to financial analysis and assets valuation, as well as theoretical foundations of maritime economics and finance. The scientific theoretical and empirical methods were used: analysis and synthesis of results and retrospective, logic and analytical methods, comparative method, methods of descriptive statistics, and econometrics, including correlation-regression analysis.

The structure of assets in the shipping industry includes tangible fixed assets, tangible current assets, and intangible assets (Figure 1). The main type of tangible fixed assets of shipping companies is sea vessels. Tangible fixed assets may also include machinery, equipment, terminals, and buildings. The tangible current assets contain cash and cash equivalents, accounts receivable, inventory, office supplies, and marketable securities. Intangible assets may include goodwill, IT software, patents, corporate intellectual property, terminal and service concession rights, customer relationships, and brand name. The aspects of goodwill are the value of the company reputation, loyal customer base, quality service, good employee relations, as well as proprietary technology.

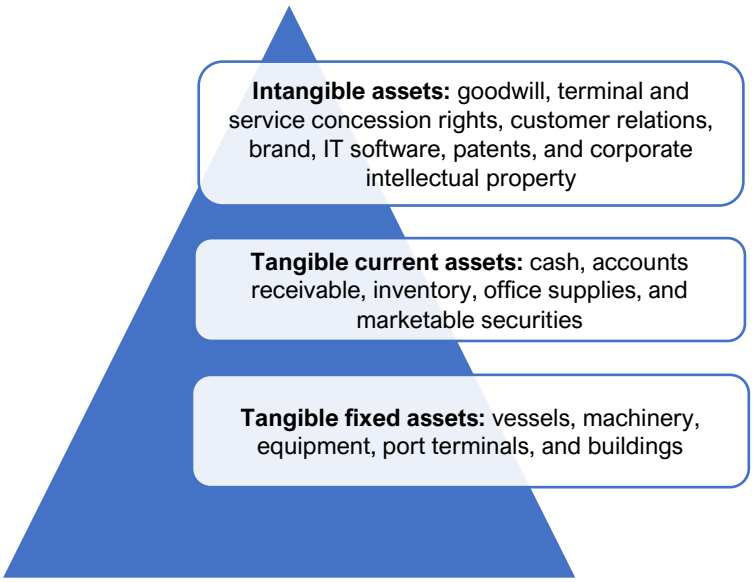

Figure 1. Shipping industry asset structure (Source: developed by the author based on CFI, 2023)

This study considers a comparison of indicators characterising the structure of intangible assets and their impact on financial results and market capitalisation of shipping companies with competitors and estimates average indicators on the example of the container sector of the shipping market. Indicators used as benchmarks are determined on the basis of financial statements of shipping companies – balance sheets, income statement, and statement of cash flows.

For the benchmarking of intangible assets, a sample of international shipping and logistic companies operating in the sector of container transportation was considered. Some of these companies are among the top ten global international carriers by fleet capacity in twenty-foot equivalent units (TEU) (Figure 2).

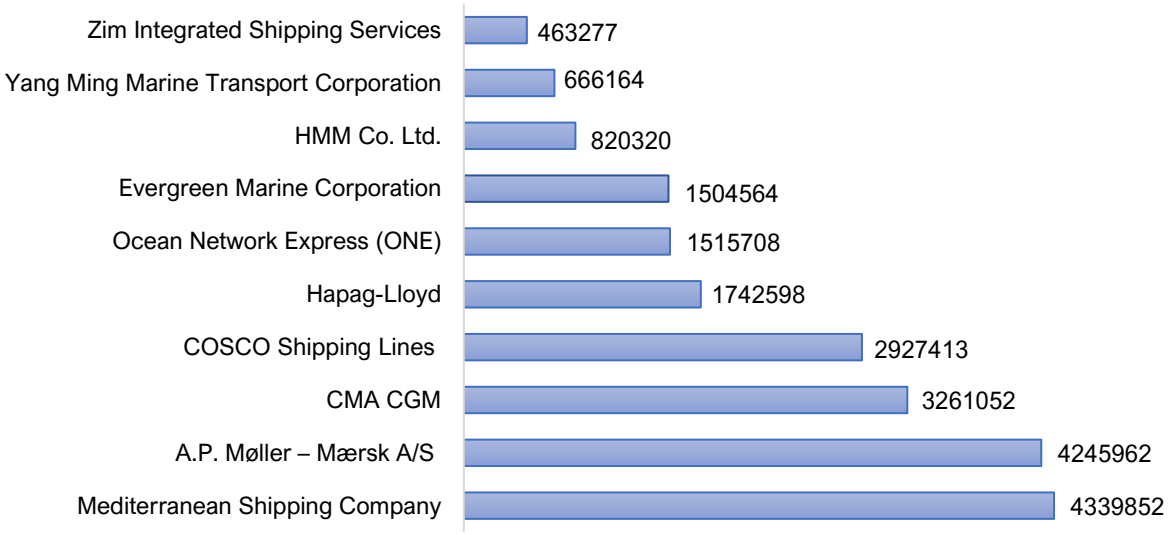

Figure 2. Top ten container operators in terms of fleet container capacity at the end of 2022, TEU (Source: Yastrebnyi and Zhykharieva, 2023)

The following companies were selected for comparative analysis: A.P. Møller – Mærsk A/S, Denmark (second place in the top ten global container operators), COSCO Shipping Lines, China (fourth place), Hapag-Lloyd, Germany (fifth place), and Evergreen Marine Corporation, Taiwan (seventh place). For comparison, relatively small shipping companies – Matson (United States) and Wan Hai Lines Ltd (Taiwan) were also considered.

The indicators for the benchmarking of intangible assets in the shipping industry are divided into three groups: indicators of the structure of assets, multiples of financial results to intangible assets, and indicators of the influence of intangibles on the market value of equity (Figure 3).

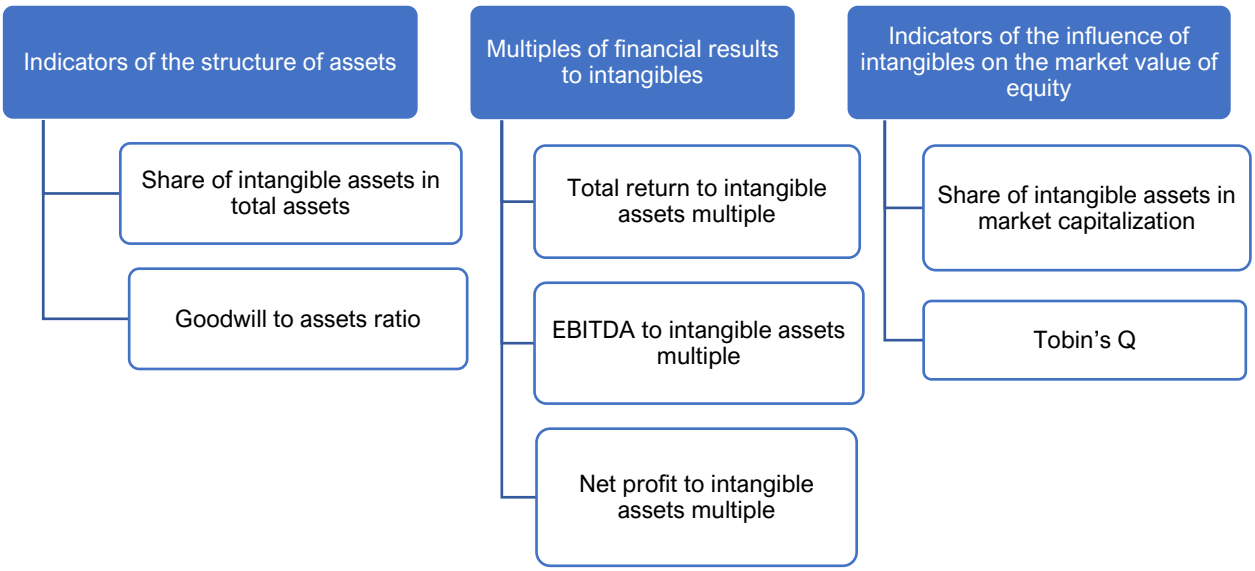

Figure 3. Groups of indicators for benchmarking intangible assets

The financial data of shipping companies for five years was analysed using statistical indicators. To estimate average values for each indicator, the arithmetic mean, the average without statistical outlier, and the median were calculated. Industry averages are defined as annual averages, averages without outlier and medians for all companies. The averages without outliers were used as the main indicator characterising average indicators in the industry. Therefore the deviation of indicators for each company for the last sample year (2022) from the industry average was determined.

4. THE STRUCTURE OF INTANGIBLE ASSETS IN THE SHIPPING INDUSTRY

The share of intangible assets in the total assets of container shipping companies was defined using their balance sheets (Table 1). A small share of intangibles in the total assets confirmed the important role of tangible assets (primarily vessels), which can be sold on the secondary market. Intangible assets are not easily separated from the company or liquidated for monetary gain. The average share of intangible assets of analysed container operators was in the range from 3.85% to 5.23% in different years. The median gives a smaller spread – from 0.66% to 1.06%. Based on the calculated annual average without outlier (2.06%), the deviation from the average industry share of intangible assets for each company in 2022 was determined. The industry average, based on the data in Table 1 without statistical outlier (Matson's indicators), ranged from 1.81% to 2.57% (Figure 4). The growth rate of the share of intangible assets in the industry – 142% (from 1.81% in 2018 to 2.57% in 2022) reflected the average dynamics of the industry for the analysed period.

Company	2018	2019	2020	2021	2022	2022 deviation from the industry average
A.P. Møller – Mærsk A/S	6.82	7.62	9.17	7.98	11.51	9.45
Hapag-Lloyd	0.02	0.02	0.02	0.01	0.01	-2.05
COSCO Shipping Lines	1.12	1.13	1.1	1.11	1.18	-0.88
Evergreen Marine Corporation	0.99	0.63	0.46	0.21	0.15	-1.91
Matson	22.29	18.65	17.92	13.78	11.61	9.55
Wan Hai Lines Ltd	0.12	0.09	0.08	0.03	0.01	-2.05
Average	5.23	4.69	4.79	3.85	4.08	4.53
Average without outlier	1.81	1.90	2.17	1.87	2.57	**2.06**
Median	1.06	0.88	0.78	0.66	0.67	0.81

Table 1. Share of intangible assets in total assets in container shipping, % (Sources: calculated using data: Maersk, 2023; Hapag-Lloyd, 2023; COSCO Shipping, 2023; Evergreen Marine Corp., 2023; Matson, 2023; Wan Hai Lines Ltd, 2023)

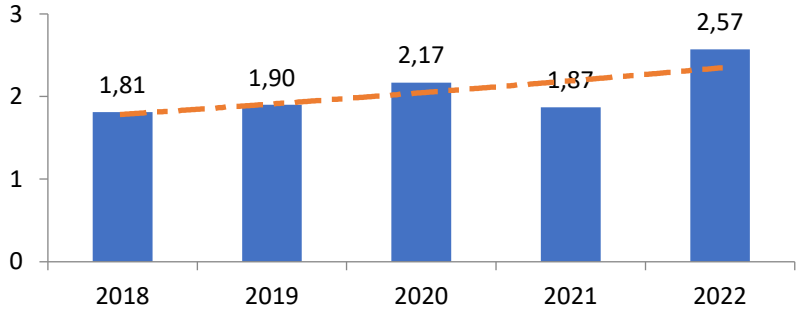

Figure 4. Trend of the average ratio of intangibles to the total assets (without statistical outlier) in the container shipping, %

The structure of intangible assets was analysed on the example of one of the world's largest container operators, using the annual financial statements of A.P. Møller – Mærsk A/S (Table 2).

Year	Goodwill	Terminal and service concession rights	Customer relations and brand name	Other including IT software
2018	15.1	58.0	24.8	2.0
2019	15.1	56.8	24.1	4.1
2020	18.8	49.2	23.6	8.4
2021	27.1	40.5	21.8	10.7
2022	48.3	20.0	23.7	8.0
Average	24.9	44.9	23.6	6.6
Median	18.8	49.2	23.7	8.0

Table 2. Structure of intangible assets of container shipping company on the example of A.P. Møller – Mærsk A/S, % (Source: calculated using data: Maersk, 2023)

The intangibles of A.P. Møller – Mærsk A/S included goodwill (USD 5205 million or 48.3% in 2022, terminal and service concession rights (20% in 2022), customer relations and brand name (23.7% in 2022), IT software and other intangible assets (8% in 2022) (Maersk, 2023).

The annual report of SMA SGM (France) identified the following types of intangible assets: goodwill, trademark and customer relationships, IT software developed or acquired for internal corporate using, and terminal concession rights (SMA SGM, 2021). For terminal concession rights the useful life is generally based on the maturity of the concession contract with reasonable assumptions of renewal.

The intangible assets of COSCO Shipping Lines included goodwill from the acquisition of subsidiaries and computer software licenses (COSCO Shipping, 2023). Goodwill is not amortised but is tested for impairment annually or more frequently if certain events or changes in circumstances indicate that it might be impaired. Computer software is capitalised based on the costs incurred to acquire and bring to use the specific software.

Hapag-Lloyd divided the intangible assets into goodwill (EUR 18.8 million in 2022) and other intangible assets. In particular, goodwill included non-separable intangible assets, such as employee expertise and synergies resulting from cargo optimisation (Hapag-Lloyd, 2023). The same approach was used by Evergreen Marine Corporation, which divided intangible assets into goodwill after consolidation and other intangible assets, including software (Evergreen Marine, 2023).

The goodwill to assets ratio shows the share of goodwill in total assets and can be considered as a factor in the valuation of a company. The goodwill to assets ratio is calculated by dividing goodwill, which is usually found in the intangible assets section of a company's balance sheet, by total assets (Kenton, 2021):

$$\text{Goodwill to assets ratio} = \frac{\text{Goodwill}}{\text{Total assets}} \quad (1)$$

The average goodwill to assets ratio varies from industry to industry, so it is best to compare the goodwill to assets ratio in a particular industry to understand which is typical. The goodwill to assets ratio is a way to see what percentage of a company's total valuation reflects its reputation and other factors that goodwill takes into account. If the ratio begins to grow rapidly, as in the case of A.P. Møller – Mærsk A/S, it means the company is buying assets with a premium. A.P. Møller – Mærsk A/S increased its total assets by acquiring other companies, so goodwill became an increasingly large part of the company's assets (Table 3).

Company	2018	2019	2020	2021	2022	2022 deviation from the industry average
A.P. Møller – Mærsk A/S	1.03	1.15	1.72	2.16	5.56	4.60
Hapag-Lloyd	0.01	0.01	0.01	0.01	0.004	-0.95
COSCO Shipping Lines	1.09	1.07	1.02	1.04	1.08	0.12
Evergreen Marine Corporation	0.89	0.57	0.42	0.19	0.14	-0.82
Matson	13.49	11.52	11.3	8.88	757	6.61
Average	3.30	2.86	2.89	2.46	2.87	2.88
Average without outlier	0.76	0.70	0.79	0.85	1.70	0.96
Median	1.03	1.07	1.02	1.04	1.08	1.05

Table 3. Goodwill to assets ratio in the container shipping industry, %

A company with a large initial goodwill to assets ratio (like Matson) may experience significant fluctuations in the value of its total assets. Over five years the value of Matson's total assets has increased by 1.8 times (Matson, 2023).

The average goodwill to assets ratio of the analysed container shipping companies in different years ranged from 2.46% to 3.3%. The median ranged from 1.02% to 1.08%. The average value for the shipping industry was calculated without taking into account the statistical outlier (Matson) and obtained a range from 0.7% to 1.7% (Figure 5).

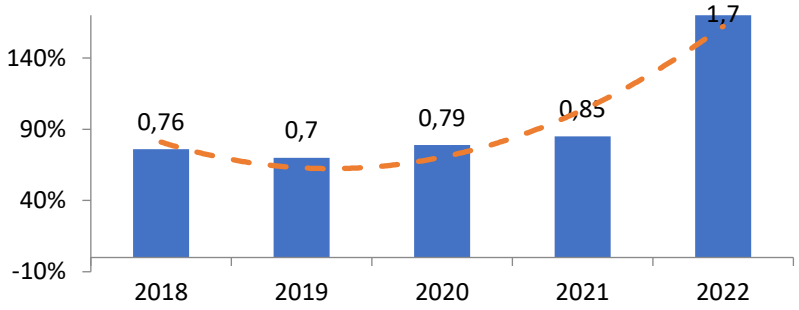

Figure 5. Trend of the average goodwill to assets ratio (without outlier) in container shipping, %

The growth of the goodwill to assets ratio in 2.2 times reflects the dynamics of mergers and acquisitions in liner shipping, and the average annual goodwill to assets ratio for the analysed period (0.96%) can be considered typical of the container sector of shipping industry. Based on this result, the deviation from the industry average for each analysed company was determined in Table 3.

5. FINANCIAL RESULTS TO INTANGIBLE ASSETS MULTIPLES

The total return to intangible assets ratio is a relative indicator that shows how many times the total return of a company exceeds the value of intangible assets. As can be seen from the results presented in Table 4, this indicator not being related to the size of the companies.

Company	2018	2019	2020	2021	2022	2022 deviation from the industry average
A.P. Møller – Mærsk A/S	9.19	13.96	7.72	10.71	7.56	-488
Hapag-Lloyd	3.45	3.80	4.37	7.17	10.62	-485
COSCO Shipping Lines	92.04	30.92	31.57	42.11	36.45	-459
Evergreen Marine Corporation	74.67	98.77	133.39	385.02	467.93	-27
Matson	0.20	0.16	0.37	1.82	2.12	-493
Wan Hai Lines Ltd	697.57	943.47	1000.28	3007.67	6417.52	5922
Average	146	182	196	576	1157	451
Average without outlier	160.5	198.5	208.9	613.9	1294.9	**495**
Median	41.93	22.44	19.65	26.41	23.54	27

Table 4. Total return to intangible assets ratio in container shipping

Among the companies considered A.P. Møller – Mærsk A/S is the largest in terms of carrying capacity, but has a relatively low return to intangible assets ratio. The statistical outlier is Wan Hai Lines Ltd data with the highest revenue growth rate. The annual average without outlier in container shipping industry is 495.

At the next stage, the ratio of profit and intangible assets was calculated. EBITDA is a popular analytical indicator that shows current earnings before interest, tax, depreciation, and amortisation. EBITDA makes it possible to compare the earnings of shipping companies operating in different jurisdictions with different tax regimes and terms of debt financing. Like the previous ratio, the EBITDA to intangible assets ratio gives a relative indicator that shows how many times the company's EBITDA exceeds the value of intangible assets (Table 5).

Company	2018	2019	2020	2021	2022	2022 deviation from the industry average
A.P. Møller – Mærsk A/S	1.17	1.35	1.60	4.17	3.41	-28.45
COSCO Shipping Lines	6.38	6.41	6.58	7.73	7.64	-24.22
Hapag-Lloyd	0.34	0.59	0.92	3.49	5.97	-25.89
Evergreen Marine Corporation	n.d.	14.11	37.00	247.09	321.09	289.23
Matson	0.55	0.50	0.82	2.65	3.04	-28.82
Wan Hai Lines Ltd	68.00	136.96	251.78	1896.50	3638.57	3606.71
Average	15.29	26.65	49.78	360.27	663.29	223.06
Average without outlier	24.07	4.59	9.38	53.03	68.23	**31.86**
Median	1.17	3.88	4.09	5.95	6.81	4.38

Table 5. EBITDA to intangible assets ratio in container shipping

The industry average excluding outlier (Wan Hai Lines Ltd data) ranges from 4.59 to 68.23 in different years, and the average for the analysed period was 31.86. Investments in intangible assets have a positive impact on EBITDA if they contribute to the growth of operating revenue or the reduction of OPEX. During the analysed period, the industry average ratio of EBITDA to intangibles increased by 2.8 times (Figure 6), which indicates a large-scale positive impact of investments in intangible assets.

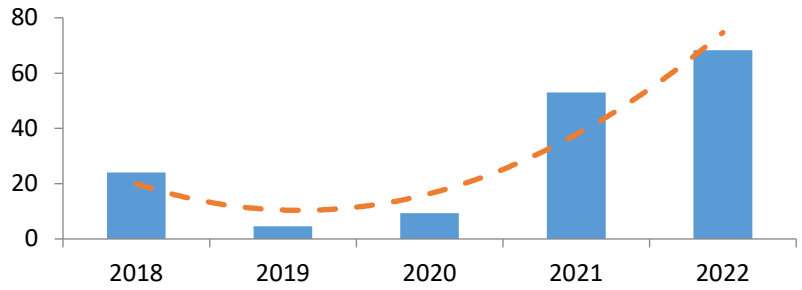

Figure 6. Trend of the EBITDA to intangible assets ratio in container shipping

The net profit to intangible assets ratio is small for most companies (Table 6), but the growth dynamics of this ratio in the industry indicates the growing role of intangible assets. For example, the profitability of tangible assets of A.P. Møller – Mærsk A/S increased from 5% in 2018 to 35% in 2022. The reason was an increase in revenue, but since the return on assets of 35% is extremely high, it can be concluded that part of the company's profitability was due to significant goodwill and other intangible assets. The conclusion about significant intangible assets is confirmed by the fact that A.P. Møller – Mærsk A/S is widely recognised in the industry as a company with a good reputation, particularly for its outstanding achievements in customer service and the integration of ESG strategies into the business.

Company	2018	2019	2020	2021	2022	2022 deviation from the industry average
A.P. Møller – Mærsk A/S	0.74	n.m.	0.55	3.11	2.71	-17.42
COSCO Shipping Lines	2.81	3.16	3.19	2.82	3.37	-16.76
Hapag-Lloyd	0.01	0.11	0.32	2.92	5.24	-14.89
Evergreen Marine Corporation	0.45	n.m.	14.40	187.55	262.73	242.60
Matson	0.20	0.16	0.37	1.82	2.12	-18.01
Wan Hai Lines Ltd	11.88	46.40	138.75	1364.20	2307.97	2287.84
Average	2.68	12.46	26.26	260.40	430.69	146.50
Average without outlier	0.84	1.14	3.77	39.64	55.23	**20.13**
Median	0.60	1.66	1.87	3.02	4.31	2.29

Table 6. Net profit to intangible assets ratio in container shipping

If the correlation between net profit and the value of intangible assets is significant, then the dependence of net profit on the value of intangible assets can be determined on the basis of correlation-regression analysis. For example, for A.P. Møller – Mærsk A/S linear correlation coefficient is 0.92 for the analysed period, which indicates a close positive relationship between the indicators under consideration. For COSCO Shipping Lines the linear correlation is 0.74. The results of the correlation-regression analysis for these companies are summarised in Table 7.

	A.P. Møller – Mærsk A/S	COSCO Shipping Lines
Linear correlation	0.92	0.74
Coefficient of determination (R^2):		
Linear model	0.84	0.54
Logarithmic model	0.88	0.55
Second degree polynomial model	0.91	0.56
Third degree polynomial model	0.99	0.65

Table 7. Correlation-regression analysis of the ratio between net profit and the value of intangible assets

All constructed regression models explain well the relationship between the studied variables, as the coefficient of determination is greater than 0.8 for all models. This means that of all the considered models, it most qualitatively explains the relationship between net profit and the value of intangible assets. A comparison of the coefficient of determination shows that the maximum coefficient of determination is the third degree polynomial regression model (0.99 for A.P. Møller – Mærsk A/S and 0.65 for COSCO Shipping Lines).

6. INFLUENCE OF INTANGIBLE ASSETS VALUE ON EQUITY MARKET VALUE

The share of intangible assets in the market capitalisation of companies varies greatly from company to company (Table 8) for the obvious reason that each company has individual characteristics related to the size, the market value of shares, and the structure of equity capital. In addition, for some companies there have been big changes over the years.

Company	2018	2019	2020	2021	2022	2022 deviation from the industry average
A.P. Møller – Mærsk A/S	16.92	15.07	12.26	8.98	27.56	23.65
COSCO Shipping Lines	2.51	3.36	3.00	2.95	2.91	-1.00
Hapag-Lloyd	0.85	0.24	0.18	0.06	0.11	-3.8
Evergreen Marine Corporation	4.22	3.21	0.8	0.17	0.4	-3.51
Matson	39.84	30.33	21.22	13.46	21.30	17.39
Wan Hai Lines Ltd	0.26	0.18	0.06	0.01	0.02	-3.89
Average	10.09	8.21	6.12	4.24	8.65	7.46
Average without outlier	4.13	3.79	3.10	2.40	6.12	**3.91**
Median	1.68	1.80	1.59	1.51	1.51	1.62

Table 8. The share of intangible assets in the market capitalisation in container shipping, %

The dynamics of the share of intangible assets in the market capitalisation of A.P. Møller – Mærsk A/S without outlier shows growth from 4.13% in 2018 to 6.12% in 2022. At the same time, the deviation from the industry average without outlier for A.P. Møller – Mærsk A/S is the maximum of the analysed sample. Based on the analysed data, it can be stated that the share of intangible assets in the market capitalisation does not depend on the size of the shipping company.

To analyse the influence of the value of intangible assets on the market value of equity capital of shipping companies, the Q ratio (Tobin's Q) was calculated. Tobin's Q can be defined as the ratio of a company's market value to the replacement value of its asset. Assuming that the market and book values of the company's liabilities are equivalent, a simplified version of Tobin's Q can be used (CFI, 2023):

$$\text{Tobin's Q} = \frac{\text{Equity Market Value}}{\text{Equity Book Value}} \quad (2)$$

Some types of intangible assets, such as goodwill, brand, and intellectual property, can be difficult to measure. Therefore the analysis of company value using Q Ratio must be adjusted for intangible assets (Corporate Finance Institute, 2018). The results of Tobin's Q calculations are shown in Table 9.

Company	2018	2019	2020	2021	2022	2022 deviation from the industry average
A.P. Møller – Mærsk A/S	0.76	0.91	1.45	0.99	0.86	-0.12
COSCO Shipping Lines	0.52	0.40	0.43	0.43	0.46	-0.52
Hapag-Lloyd	0.06	0.21	0.24	0.30	0.11	-0.87
Evergreen Marine Corporation	0.76	0.82	1.92	2.12	0.58	-0.40
Matson	1.80	2.17	2.55	2.27	1.03	0.05
Wan Hai Lines Ltd	1.06	1.20	3.02	3.87	1.03	0.05
Average	0.83	0.95	1.60	1.66	0.68	1.14
Average without outlier	0.63	0.71	1.41	1.54	0.61	**0.98**
Median	0.76	0.87	1.69	1.56	0.72	1.12

Table 9. Tobin's Q analysis in container shipping

If Tobin's Q is greater than 1, the market value of the company exceeds the book value of the assets. In this case, the company is overvalued because the market value reflects some unmeasured or unrecorded assets. If Tobin's Q is greater than 1, it means that the company's profits exceed the cost of restoring the assets. When the ratio is lower than 1, the book value of the assets exceeds their market value. This means that the market is undervaluing the company for some reason. The ideal scenario is when the Q ratio is equal to 1. In this case, the market fairly values the company's assets.

As can be seen from the results of Tobin's Q calculations, the industry average without outlier is 0.98, which is close to 1. The results vary between companies; for example, Hapag-Lloyd's assets are undervalued, while Matson's assets are overvalued. The results of the calculations also indicate that Tobin's Q fluctuates quite significantly from year to year.

7. CONCLUSIONS

Indicators of the share of intangible assets in total assets and the ratio of goodwill to assets made it possible to characterise the structure of companies' assets in the industry. On the one hand, the shipping industry is characterised by a low share of intangible assets (about 2.06% on average for the industry over five years), which indicates the capital intensity of the industry and the important role of tangible assets. For comparison, the share of intangible assets of companies in the energy sector in 2020 was 22%, and in the industrial sector – 87% (EverEdge, 2021). On the other hand, the growth of the share of intangible assets in the industry at the level of 42% over the analysed period indicates the growing trend and importance of intangible assets for improving business efficiency. At the same time, the growth of the share of intangible assets, for example, in the energy sector from 2000 to 2020 was only 14% (EverEdge, 2021). A typical value of the average goodwill to assets ratio in the industry was about 1%. The growth dynamics of this ratio by 2.2 times during the analysed period indicates the intensification of merger and acquisition processes in container sector of liner shipping.

The ratio of total return to intangible assets, EBITDA to intangibles, and net profit to intangible assets make it possible to determine the multiples of financial results to intangible assets. The results of the calculations indicate that the ratio of total return to intangible assets is not related to the size of the company. The growth of the industry average value for the analysed period indicates a significant increase on the level of profitability of intangible assets, taking into account the positive dynamics of the share of intangible assets.

The growth rate of the average ratio of EBITDA to intangible assets over the analysed period (2.8 times) shows the large-scale positive impact of investments in intangible assets. The average ratio of net profit to intangible assets has shown significant growth over the analysed period, which indicates the increasing role of intangible assets in increasing the efficiency of the industry. If the correlation between net profit and the value of intangible assets is significant, regression analysis can be used to explain the relationship between the variables. Using the example of the A.P. Møller – Mærsk A/S, it has been demonstrated that various regression models explain the relationship between net profit and the value of intangible assets by 84-99%.

The share of intangible assets in the market capitalisation and the Q ratio make it possible to estimate the influence of the value of intangible assets on the market value of the company's equity value. The results of the analysis show that the

annual average Tobin's Q for the industry is 0.98, which means that the market is relatively fairly valuing assets in the shipping industry.

The proposed methodical approach to benchmarking intangible assets in the shipping industry makes it possible to determine the features of the structure of intangible assets and the impact on profitability and market value of equity by means of a comparative analysis of relevant groups of indicators. The obtained research results can be used for further development of the methodology for benchmarking of intangible assets and financial analysis in the shipping industry.

CONFLICT OF INTEREST

No potential conflict of interest with respect to the research, authorship, and/or publication of this article has been declared by the author.

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